

78.9

A
Natural and Medicinal
HISTORY
OF
WORMS.

Bred in the Bodies of MEN and other
ANIMALS;

Taken from the Authorities, and Observations
of all AUTHORS who have Treated there-
of, from *HIPPOCRATES* to this Time:

TOGETHER

With an Enquiry into the Original of WORMS, and
the REMEDIES which destroy them, with a particular
Formula of Medicines adapted to the USE of FAMI-
LIES, and Illustrated with several Copper CUTS.

Done from the Latin of D. Le CLERC, M.D.
By the *Compiler* of the General HISTORY of
DRUGS, from *Pomet, Lemery, Tournefort, &c.*

L O N D O N :

Printed for J. WILCOX, at the *Green-Dragon*, in
LITTLE-BRITAIN. M.DCC.XXI.

e

W. Sturges



The Translator's Preface, &c.

formance, because it was the main Inducement that invited me to Undertake this Translation, which otherwise would have prov'd a Labour too tedious for my then painful Indisposition, which was agreeably allayed by the Pleasure I took in the following Work which I have endeavour'd to render as pleasant to the Reader in this Version as the Nature of the Subject, the Variety of Style from the different Quotations, and the Idiom of the English Language from the Latin Tongue would permit me.

AND now I hope the impartial Reader will receive this with a Candour equal to the Intention with which it was Written ; and let the Faults that appear to arise, either from the Press, or the Performance be buried in the Translator's real Design to promote Knowledge, and do Good to his Fellow Creatures.

THE

*These and many other AUTHORS Quoted in
this TREATISE.*

A	G.	P.
Aristotle,	Galen,	Paulinus,
Aldrovandus,	Gabricinus,	Pomerius,
Acivarius,	Gemma,	Prosper (Abbas),
Apuleius,	Gindolphus,	Pauli (Simon),
Avecan,	Goedatius,	R.
Alexander Benedictus,	H.	Rondeletius,
Asclepiad s,	Hippocrates,	Riverius,
Alfaravius,	Harduinus,	Reji,
Albertus,	Hollerus,	Renfilius,
Amatus,	Heiculus (Sixonic),	Ray,
Aldrovandus,	Harderus,	Regis (Petrus),
Agineta (Paul),	Horstius,	Ruyfch,
Andry,	Hamelburgius,	Riolanus,
B.	Hochestetter,	S.
Borrichius,	Hirtfoker,	Spigelius,
Belus, (Lucianus),	Hildanius (Fabricius),	Senuertus,
Brancutus (Heracles),	Hyde,	Sanchez (Transiscus),
Baglivi,	I.	Sydenham,
Bartholine,	Julius (Alexandrius),	Schrochius,
Byler (Lucas),	Johnlon,	Sylvius (Petrus),
Breygerus,	K.	Schelhammer,
Balulinius (Gasper),	Keuchnius (Robert),	Scharnis,
Bidloo,	Keller,	Schemichius,
Beckers,	L.	Schockius,
C.	Largus (Scribonius),	Schulzcius,
Cato,	Leuvenhock,	Scalpartius,
Comarius,	Lentilius,	Silumethus,
Caelius (Aurelius),	Lufitanus (Amarus),	Severinus,
Celsus,	Lancifius,	Schmidt,
Conringius,	Lemery,	T.
Clerc (James),	Luffraus (Zarut),	Trallianus,
Chenaul (Jacob),	M.	Tyson,
Collado (Petr.),	Manardus,	Torquatus,
D.	Mercurialis,	Tulphus,
Dioscorides,	Malphighus,	Thoplingius,
Donatus,	Morgani,	U.
Dokrus,	Miomina,	Villanovanus,
E.	Monardus,	Valeroli,
Erotianus,	Mouffetius,	Vallisoerius,
Alian,	Milbranch,	Velchius,
Atius,	Mangerus,	Veslingius,
Etmuller,	N.	Volfius (Gasparus),
Epicurus,	Nicholas (Florennius),	Vicquius,
F.	Numelbergus (Gab),	W.
Foefius,	O.	Will's,
Fernelius,	Oligerus,	Wedelius,
Forestus,	Oethaus,	Wagnerus,
Fabricius,	P.	Wickerus,
Fallopia,	Pliny,	Z.
Fagon,	Perdalcis,	Zwingerus,
Ernius,	Pegerus,	



TO HIS GRACE

F O H N,

Duke of MOUNTAGUE,
K N I G H T, of the most No-
ble O R D E R of the G A R -
T E R, &c.

MY LORD,

THE Honour your GRACE hath
done the *Faculty of Physick*,
especially those who are Mem-
bers of the UNIVERSITY,
wherein your GRACE was pleas'd to
accept of the *Doctorate*, calls for a par-
ticular Acknowledgement of Thanks,
in perpetuam rei Memoriam from the
A 2 whole

The DEDICATION.

whole Profession, especially for that distinguishing Condescension in the Duke of MOUNTAGUE, to be admitted a Fellow of the *Royal-College of Physicians*, which tho' Eminent thro' all the World for Literature, and Illustrious for the Personages, which compose this *Society*, yet it must be confes'd shineth much brighter from the Rays of. your Grace's Honour, and distinguishing Quality.

THE Subject is *Medical* and *natural HISTORY*, which of Right claims your Grace's Patronage, and Protection. In the following Sheets, my LORD, you will meet a Library of Learning abstracted from the Ancient as well as Modern *Greek, Latin* and *Arabian* Writers: Besides which the Compiler of this History hath trac'd the *Spanish, French, English* and *Italian* Authors, among whom your Grace will take pleasure in the laudable Discoveries of the Accurate *Villisnerius* and *Redi*, the indefatigable Pains of our own *Tyson*, the minute Microscopical

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scopical Observations of *Lewenhoeck*,
Hartsoker, *Morgagni*, &c. the industrious
Inquiries of *Schel-hammer*, *Schenkius*,
Malphigius, all who together, with ma-
ny more Eminent learn'd Physicians
and Naturalists have Contributed to this
useful as well as curious Work; where-
in the most Exquisite and Ingenious
Vallisnerius makes the Origine of
WORMS, Coequal with that of *Adam*,
and says, that the Eggs of all those
Worms or *Insects* that breed in the Body
of Man, were at first Created in the
Body of *Adam*; nor were they exclud-
ed before his *Transgression*.

IF we seriously Consider the Number
of *Insects* met with in this *Microcosm* of
ours, as well as the numberless Num-
bers found in the *Macrocosm*: If we
reflect, I say on the exquisite Fabrick
of them, with their Minuteness, next
to Atoms themselves; together with their
various Changes and Forms, Colours,
and almost incomprehensible Genius,

The DEDICATION.

we cannot but acknowledge the moving Hand of the great Artificer; and as these are infinite in Number, and Variety, so are they in their Uses.

FROM various *Insects* abroad in the World, we have Remedies in many Diseases, and Food that is grateful to the Palate in many Countries; whence the Wisdom and Existence of God is manifested, and it is wonderful what is affirmed of *Worms*, by the learned *Vercelloni*, of all which saith he, the *Thyroide Gland*, is the Ovary to Communicate a certain Vital Principle to the *Chyle*.

AND that all Kinds of Worms might be preserved, especially that of *Insects*, it appeared necessary that the Seeds or Eggs of them might be Multiply'd to an infinite Number, lest all should be lost, or destroy'd by some external Injury; or that the Off-spring of Worms produc'd from those Eggs, might be so Numerous, that the whole might never perish from the inclemency of
of

The DEDICATION.

of Air, or any Accidents from Men, or other Animals, but avoiding all Casualties there might still be sufficient to propagate their Kinds.

THE vast variety of Existencies that are to be met withal in this capacious Field of Nature that fall under your Graces Observation, must needs heighten the Pleasures of Life, and give a particular Relish to the other Satisfactions you enjoy from the Affluence of your Fortune. What Raptures of Delight must fill your Grace's Soul, when under the Contemplation of the Creature, you are lead into an Admiration of the Creator, and while with borrow'd Opticks you Survey the invisible Entities of the Creation to your naked Eyes; Surprize and Wonder makes you gaze on those minuter Beings, as of a more exquisite Form and Contrivance than those larger Animals, the Elephant and Whale, the Bulkiness of whose Parts shew them to be of a courser Mould, sluggish

The DEDICATION.

gish and unactive, and Consequently affords us less Occasion for Curiosity, which puts a Check to our inquisitive Researches.

MY LORD,

I WILL not pretend to detain your Grace longer upon this Subject, which you are so fully Master of, therefore have nothing more to say, but to ask Pardon for this Presumption, and employ your Grace's candid Reception, which is the utmost Ambition of

My LORD, your

GRACE'S most devoted

Humble Servant to command,

J. BROWNE.



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ion,

THE

Translator's Preface

TO THE

READER.



THE Beginning of the following
*Work, may perhaps appear heavy
and tedious to the common Rea-
der, if he does not take this Pre-
caution along with him, that the whole Book
had been altogether Unintelligible, and
Useless, had not the Compiler learnedly,
and industriously, describ'd and distin-
guish'd the three Sorts of Worms, he
Treats of, and about which, there had
been*

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NE.

The Translator's Preface

been so much Difference among the Physicians of all Ages, and these are the Teretes, or common round Worm, The Ascarides, or little small white Worm, and the Lati or Tape-Worms, otherwise call'd the Tæniæ.

THESE last Kind of Worms, which are flat and long, the Greek and Latin Writers from their Resemblance call'd the Tape-Worm; but the Arabians, who came after them named, and describ'd that flat Worm, from its form and likeness to a Gourd-Seed, a Gourd-Worm, and all their followers take Notice of this Worm, as of a short flat Kind, whereof there are many link'd or hanging together, as in a Chain, and so make One very large Worm; but whether this be the same in Specie remark'd by the Greeks, or one of a different Sort is the Dispute, which our learned Author hath reconciled from various Authorities, and hath fairly set the Controversy in a true Light between Andry and Vallisnerius about the Generation of Worms, &c.

BUT

to the READER.

BUT I shall not trouble my Reader here with the nice and distinguishing Part of this History, that being sufficiently handled in the following Work ; but I think it is necessary to observe how Useful this will be to all Families in General, there being very few, but who in one part of Life or another, have occasion for Directions as well as Medicines in this almost Universal Malady, which our learned Compiler hath provided against in all, and every of its Circumstances, and that not only with what may be had from the Shops ; but also what every One is provided with at Home ; as Honey, Salt, Sugar, &c. and for the better Sort there is a Formula of Medicines suited to most Cases, which are easy to be had by the prudent Application of a Master or Mistress of a Family.

THIS Tract was recommended to Me, as a thing that would be of a great Service to the Publick, if Translated, by the ingenious Mr. Richardson in Aldersgate-Street,

The Translator's Preface

Street, Apothecary, who was so kind as to make me a Complement of one of the first Books that were brought over, which very well pleas'd me in the perusal, and knowing he had an excellent Judgment in the Medicinal Art, as well as a delicate Taste in all kind of Literature, I immediately set about the Version, being at that time tyed by the Foot by the Misfortune of a Weakness that seized upon all my Limbs especially my Legs and Feet.

I must beg leave to inform the Reader, that we have not engraved all the Tables that are in the Original, but to supply what I thought not absolutely Necessary, and ease the Bookseller of the Load that too many Plates would lay upon the Impression, and so consequently Enhance the Price of the Book; I have given an Explication of all the Figures, as they are in Le Clerc's Latin Copy, and we hope shall be pardon'd for this Omission, which may be atton'd for by Engraving the whole, if the publick

to the READER.

lick Favour this Undertaking with Encouragement enough for a second Impression. Besides, as the Figures are referr'd to in the Body of the Work, and could not be well avoided, I am of Opinion the Explication of them will be very Necessary and Satisfactory at least to the common Reader; the Learned having the Advantage of Consulting the original Latin, and therefore stand in no need of any Assistance from this Translation, which is chiefly Calculated for the Use and Instruction of private Families.

I AM humbly of Opinion nothing can contribute more to the Relief of such as are distress'd with Worms of any Kind, than this compleat Collection of Medicinal-Knowledge from the Learned of all Ages. The Histories are concise, curious and well adapted; the Recipes, or Prescriptions Judicious, and founded upon the Experience of Antiquity, as well as the modern Discoveries of the most eminent Physicians, that have practic'd or wrote upon this
Sub-

The Translator's Preface

Subject from Antiquitie down to this Day: And our Author hath not only quoted the best Authorities, but hath Learnedly delivered his own Opinion, with the most accurate Judgment, and sagacious Verity.

O U R Author is no vain Trifler, neither hath he stuff'd his elaborate Undertaking with unnecessary Quotations, and Repetitions, but prudently distinguish'd what is nice, curious and instructive from vulgar useles Trash; he hath winnow'd the Wheat from the Chaff, and instead of Digressing from his Subject, hath every where thro' the whole Interlarded it with his own Judicious Reflexions, Observations, and incomparable Practice: In short, this Work is as valuable a Treasure to the Learned, as it is useful and advantageous to the incurious and common Reader.

I have the vanity to hope I shall be pardoned for being in Love with the Performance,



THE CONTENTS.

C H A P. I.

Page 1. **O**F certain Sorts of Worms in human Bodies long since discover'd, but little observed, at least ill described. Of the three Kinds of Intestine or Gutworms, distinguish'd by the Greek and Latin Physicians, viz. Teretes, the round Worms, Ascarides, the small Worms, and Lati, otherwise call'd Tænix, the flat or tape Worms; of the Diversity of Opinions amongst Physicians concerning the flat Worms; of the Seat of the flat Worms among the Greeks and Latins; also of the various Greek and Latin Names of Worms.

CHAP. II. Pag. 12. Of the three Kind of Worms indicated by the Arabian Physicians, the round Worms, broad and small Worms, of the broad Worms otherwise call'd by them Cucurbitini, of the confounding the Ascarides with the Cucurbitini, by the Interpreters of the Arabians; of some Places in Petrus de Albano, and some other Authors, in which 'tis shew'd that the broad Worms gather themselves together, so as to form a Chain or Link of one Animal, or to make themselves one Kind of Worm.

CHAP. III. Page 21. Of the two kind of Broad Worms, distinguish'd, but not describ'd by Arnaldus Villanovanus,

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linus; the only the long broad Worm, the others the short broad Worms, or the Cucurbitini; to these belong, 3dly, the long round Worms, or Tertes, 4thly, the short round Worms, which are the Ascarides of the Greeks. 5thly, the large Worm, otherwise call'd Solian or Cingulum, & the Flaccus Gabucinus, from whence we gather that the large Worm of Arnaldus, is nothing but a Bag, containing sometimes the Cucurbitine Worms; of the great Mistake of Gabucinus, reckoning this Bag for the broad Worm of the Ancients.

CHAP. I. Page 25. Of the great Confusion in the Writings of the modern Physicians, about the Nature of the broad Worm, and of their Disagreement. Of certain Persons who think that the Cucurbitine Worm, were forged by the Arabians; of others saying whatever is related of the broad Worm is a Trifle, that some others seem to allow of the two Kinds of broad Worms, but that they know not how to distinguish them asunder; that some of whom Platerus is the chief, expressly distinguish two kind of broad Worms, or Tania, and do describe the broad long Worm different from the Chain of the Cucurbitini, but take contrary the Opinion of Petrus de Albano, who call'd by them a Tania of the second kind for one single long Worm, and say, that the broad short Worm of the Arabians, or the Cucurbitini, is nothing but the fragments of the Body of the Tania, like the Seeds of a Cucumber. Of others, lastly, who after having seen the same Cucurbitine Worm, took it for the Ascarides, or some other monstrous Worm, so that the Cucurbitinus hath been a long time unknown and buried in Oblivion.

CHAP. II. Page 33. Here the Reader is desired to consult Dr. Tyson's Dissertation of Worms, the sequel whereof will shew, that he was sometimes mistaken, and also you will find something which may be serviceable to your understanding the Nature, not only of the round Worms, but also the Broad Worms, as we shall see more plainly; also there are many Places where Names are quoted by Tyson, to which I shall give either another or a fuller Explanation, and where he speaks of the Ascarides, I thought it proper to transcribe this Place, as well for the Benefit of the Curious, as to satisfy our proper Words of the Author.

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Authors, as also because the whole Paragraph was not altered by the said Author. Add to the above
 CHAP. VI. Page 46. Contains an accurate Description of Gourd Worms, and the 2d Tape Worm of Platerus, or the degenerate base Tape Worm of Spigelius, and of the Tube in which the Gourd Worms are sometimes invol'd by Vallisnerius, in which the Opinion of Andry, Tyson, and others, who accounted this Tape Worm one single Worm is refuted, and all Controversies on this Subject removed.

CHAP. VII. Page 96. Of the first Tænia of Platerus, that the Tænia is a rare Animal, but not a feign'd and monstrous one, which of the Tænia is most rare, which of them was known to the ancient Greeks, the Trunk of the Body of the first kind of the Tænia describ'd.

CHAP. VIII. Page 122. The description of the Tail and length of the Tænia.

CHAP. IX. Page 129. The description of the Head of the Tænia, taken from many Authors, as well as my own Observations.

CHAP. X. Page 161. Whether there are many Tæniae, or only one found in the Intestines of Men, and consequently whether the Tænia breeds; that the Tænia of the first kind is one single Worm and not many.

CHAP. XI. Page 171. How long the Tænia lives, a Place of Hippocrates explain'd concerning the broad Worm growing old with the Man, a vain and useless Enquiry after the Tænia, and whether it is bred in the small Guts, or in the large, also of the Tænia found in the Woman's Womb.

CHAP. XII. Page 175. Of the Diagnostick and Prognostick Signs of both the Tæniae.

CHAP. XIII. Page 197. That other Worms besides the broad Worms molest Men, with the description of the Dog Tænia. Page 198. Of the Lingula or tongue Worm, a round and long Worm in Men and Dogs. Page 200. Of the Dog Tænia, and the other Worms in Dogs and Cats.

204. Of the difference of the Teretes or round Worms in Men. 206. The Anatomy of the Teretes or round Worm, found in humane Intestines by Redi. 241. Long and very small round Worms without the Guts Worms call'd Ascarides.

242. The little Dragon, or vena Medinensis, the vein Worm

from

from

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- from several Authors. 257. Of the little Worm causing the Bovine or Ox Affection so call'd. 260. American Worms that are troublesome to Mens Feet. 262. The Worms call'd Syrones, which procure Death, also those of the Eyes. 263. Many other Worms, either scarce, monstrous, or Fabulous. 264. Insects coming from without, are sometimes believed to be bred in the Body: Worms excreted with the Urine. 268. The Worms of Ulcers or Abscesses. 269. That Things inanimate like Worms, among which are the Polypus, found in the Head, Blood-Vessels, and other Visera, give farther Occasion for Physicians to mistake. 271. Worms found in the Veins and Vessels. 278. Spermatick Worms. 280. Crinones, or hair Worms in Children, call'd by the French Soyes, also Mascous. 281. That Things externally abjunct to the Bodies of Worms, sometimes are not distinguish'd from Worms. 282. Worms found in the Brain and different Parts of the Head, and first those in the Nostrils, or the Os Frontis. 294. From whence Worms come at first, not considering from what Part they are produced. 296. Worms of the Eyes. 297. Worms of the Teeth. 305. Worms of the Teeth call'd Syrones, Worms of the Ears. 308. A Worm found in the Heart, Lungs, Liver and Spleen. 312. The Umbilical or Naval Worm. 322. Of the Worm call'd Omaso. 222. Rough or hairy Worms. 324. Considerations of monstrous Worms. 327. Worms that procure singular Diseases beyond the Course of others.
- CHAP. XVI. Page 329. Of the Origin of Worms living in Animal Bodies.
- CHAP. XV. Page 366. Of Medicines which expel Worms. 203. Simple Medicines against Worms, taken from Plants. 304. Leaves. 305. Flowers, Fruits and Juices. 306. Seeds, Woods, and Barks, concreted Juices, Gums, and Resins. 307. Oils, simple Medicines against Worms, taken from Animals. 308. Simple Medicines taken from Minerals, compound Medicines taken from Plants.
- Page 399. A short Formula of Prescriptions against Worms to the End.

N. B. Figure 3d in the 8th Table, and Figure 1R and 2d in the 9th Table, and the Tables 11, 12, and 13, are omitted in this Translation, as not being so useful as those which are here inserted.



A N

EXPLANATION

OF THE

TABLES and FIGURES.

TABLE I.

Letter A.

Days after the Exclusion;
all these united, measur'd
8 English Yards, or 24
Foot long.

Letter B. Taken from

TAKEN from Dr. Andry of the Generation
Tyson, represents of Worms; represents a
a flat or tape tape or flat Worm call'd
Worm, or rather a great by him the *Solium*, which
many sticking together, a Youth labouring under
call'd *Gourd Worms*, void a Pleurisie, with a Delir-
ed from a young Fellow ium, by taking of a
at London, and drawn some Physical Potion, voided
at

An Explanation of

at Paris, the 9th of June 1698. This Worm was like the *Tania*, 4 Ells, 3 Fingers long, though part of one End was broke off, and lived after it was freed from the Excrement 5 Hours, it was small and thin towards the Head, and half an Inch broad about the middle part. *A.* Shews its black Head, larger Eyes, the Body in a manner white; it is divided into many Joynts, at *B* the Sides are composed of many Nipples, at *C* in every one of which appear a Vessel, at *D* inclining to a sky Colour (which could not be express'd in this Figure) and stretching to the mid-breadth of the Body.

TAB. II.

From *Vallisnerius*, concerning the Origin of Worms in human Bodies.

Figure 1. Part of the Chain of a *Gourd Worm*, which while whole look'd

like the *Solium* as it is call'd by *Andry*.

Fig. 2, and 3. Two *Gourd Worms*, voided singly, or separated from others.

Fig. 4 and 5. Two other *Gourd Worms*, view'd some Hours after Exclusion with a Microscope, by which means the Wrinkles appear lengthways on the Body, and two small Horns towards the narrow Part, by the help of which one adheres to the other, *Let. b.* at Fig. 4. shews the convex Part of the Worm, *Let. a.* Fig. 5. the Concave, the little Horns. *e e f f.*

Fig. 6 and 7. Shews two Worms side-ways, arched in the manner of a Crescent, mark'd *d. e.*

Fig. 8. Shews the Link or Chain of *Gourd Worms* seen some Hours after Exclusion; this differs from that in the 1st Figure, because the Curplings which are here do not appear in that.

Fig.

the Tables and Figures.

Fig. 9. This is the same Chain of *Gourd Worms*, the external Species of which, after some time voided, is so chang'd that the Mamillary Promineales are contracted, and difficult to discern; but the lacteal Vessels very apparent; yet at the same time in every Ring of this Figure, they vary much in their Conformation, as is plainly observable by the Letters *a, b, c, d, e, f, g, h, i, l.*

Fig. 10. A Fragment or Part of the Chain of *Gourd Worms*, dry'd and Diaphanous.

Fig. 11, 12, and 13. Shew three dry'd *Gourd Worms*, which the Author could not separate from each other without breaking.

TAB. III.

From the same Author, and from *Ruyfch.*

Fig. 1. A *Gourd Worm* excreted from a Dog, enlarg'd by help of the

Microscope, the Head appears as it were arm'd with two rows of Spikes, as taken from Dr. *Tyson.*

Fig. 2. The same Worm drawn side-ways.

Fig. 3. The same enlarged by the Microscope, with a protuberant Nipple.

Fig. 4. The Head of the *Tania*, which is drawn by *Malpighius.*

Fig. 5. The *Ascarides*, drawn by *Contolus.*

Fig. 6. The same side-ways.

Fig. 7. The same folded round.

Fig. 8. The same dry-ed.

Fig. 9. The same dying according to *Contolus.*

Fig. 10. The *Ascarides* in their Natural Size.

TAB. IV.

Which is the same with that taken from *Redi.*

Fig.

An Explanation of

Fig. 1. The *Teretes*, or round Worm, voided from a Man.

c. The Mouth.

d. The Tail.

Fig. 2. The Alimentary Duct of the same Worm; the beginning of the said Duct answering to the Mouth, *a.* another end corresponding to the vent.

Fig. 3. A white circular Duct, winding in many Folds, and full of a milky Juice, to be met with in all kind of round Worms that Men are subject to; but that Duct is drawn larger and beyond its natural Size by *Redi*, that its Figure might be more commodiously observed.

Fig. 4. A white Duct that is not Circular, full of a white milky Liquor.

Fig. 5. The Worm call'd *Ascarides*, enlarged by the Microscope, and delineated by *Redi*.

TAB. V.

From *Spigelius*, *Gemma*, and *Sanches*.

Fig. 1. The Flat Worm or *Tania* of the first kind, drawn by *Spigelius*.

Fig. 2. The spurious *Tania* of *Spigelius*, taken by himself from the Works of *Cornelius Gemma*; or rather a link of *Gourd Worms* ill represented by *Gemma*.

Fig. 3. The same link copied from *Sanches*.

TAB. VI.

From *Aldrovandus*, *Fabricius* and *de Heyde*.

Fig. 1. A flat Worm, or *Tania* of the first kind, drawn very wrong by *Aldrovandus*.

Fig. 2. The same Worm much better depicted by *William Fabricius*, the upper part of which is shewn by the Letter *A.* the lower *B.*

Fig.

the Tables and Figures.

Fig. 3. A Fragment or Piece of the *Tania*, done by *de Heyde*, and enlarged by the Microscope, in which the Joynts *AA* cohere with the Body *B*, the Tube or Duct *CC* is divided into many lateral Branches, *DD* the very Sides seem to be supply'd with the Duct *EE*.

TAB. VII.

Taken from *Le Clerc*.

Fig. 1. A *Tania* of the first kind fresh voided.

Fig. 2. The same Worm but larger and newly discharged.

Fig. 3. A broken piece of the same appearing as were dry'd.

TAB. VIII.

From various Authors.

Fig. 1. *A.* A flat Worm or *Tania* of the first kind, with the Head and Tail from the last Edition of *Tulpius's* Observations.

B. Part of the same Worm, from the first Edition, in which there are two Heads or Horns *a, b*, of which the first is entire, the other not so; there are two pervious Places *c, c*, and black Spots at *d*.

Fig. 2. A piece of the same, with the Head annex'd, from *J. Mich. Febr.*

Fig. 3. A Fish call'd *Acus*, from *Rondeletius*.

Fig. 4. A broken piece of the hairy *Tania* with the Head from *Panthotus*.

Fig. 5. Another from *Le Clerc*.

Fig. 6. The Head of the same dry'd and enlarged by the Microscope.

Fig. 7. A Worm call'd the Enemy of the *Eruca* from *Gadartius*.

TAB. IX.

From *Redi*.

Fig. 1. Two Snails in Coition.

Fig.

An Explanation of

Fig. 2. A flat Worm
of a Wether's Liver.

Fig. 3 and 4. Flat or
broad Worms, taken
from the Guts of Cats
and Dogs.

Fig. 5. Other flat
Worms from Cats and
Dogs, but shorter.

TAB. X.

From *Vallisnerius*.

Fig. 1. A Worm taken
from the Guts of a Calf,
and inspected on the back
part.

a. Its Head.

b, b, b, b, c, c, The
Alimentary Duct, ting'd
with a pale yellow Co-
lour, transparent thro'
the Skin.

c, c, c, c, The Sper-
mattick Vessels, transpa-
rent in many Places,
gliding over the alimen-
tary Duct, and wrap'd
around it.

d. The Tail of the
same Worm.

Fig. 2. The same
Worm inspected from
the Belly.

a. The upper Part and
Head of the Worm.

b. The Foramen or
Passage thro' which the
Eggs are excluded.

c, c, c, c. The Ovary
of the Worms, the white
colour whereof is seen
through the transparent
Skin.

d. The Place wherein
the Ovary becomes for-
ked.

e. The Oviduct, seated
at the Foramen *b*.

f, f, f, f. Innumera-
ble and intricate Wind-
ings, constituting the
spermattick Vessels, and
Ducts, whose white Co-
lour appears thro' the
skin.

g. The Tail which the
Foramen, by which the
Excrements are voided.

Fig. 3. The round
Worm in a Calf, which

the Tables and Figures.

is often thicker and harder than the others.

a. The Head of the Worm, with 3 round protuberances jutting out

b. A binding of the said Worm, in which Place the Foramen of the Eggs is seated.

c. The Place where the Worm is cut.

Fig. 4. The Head of the Worm inspected on the forepart, and enlarged by the Microscope.

TAB. XI.

Fig. 1. The double Ovary in the round Worms of Men.

a. The Excretory Duct of the Ovaries.

b. The Place in which the Ovaries are united into the common Duct.

c, c, c, c. The Ovaries.

d, d, d, d. The End of the Ovaries.

e, e. The Place in which the spermaticks are cut and ty'd.

Fig. 2. The Worm of a Calf opened.

Fig. 3. The Ovary of the Worm of a large Calf.

Fig. 4. The Ovary of a common round human Worm.

Fig. 5. The Egg of the same kind of Worm enlarged by the best Microscopes.

TAB. XII.

From *Bidloo*.

Plain or flat Worms, commonly found in Sheeps Livers.

TAB. XIII.

Taken from *Ettmuller*, *Ruyfch* and *Lewenbooke*, exprefs the *Crinous*, *Hair-Worms*, fuch as are excreted with the Urine, and the *Animalcula* in the Scales and foulnefs of the Teeth, enlarged by the Microscope.



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A General
HISTORY
OF
WORMS.

CHAP. I.

Of certain Sorts of Worms in Human Bodies, long since discover'd, but little observ'd, at least ill describ'd. Of the three Kinds of Intestine or Gut-Worms, distinguish'd by the Greek and Latin Physicians; viz. Teretes, the round Worms; Ascarides, the small Worms; and Lati, otherwise call'd Tæniæ, the flat or tape Worms. Of the Diversity of Opinions among Physicians concerning the flat Worms. Of the Seat of the flat Worms among the Greeks and Latins; also of the various Greek and Latin Names of Worms.

HOW great an Obscurity the Natural History of Insects formerly laid under, is publickly known, especially to the Learned, by whose Industry those Mists were clear'd up. For Physicians and Naturalists are deservedly blamed, that
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they had not made a narrower Search after those Worms which breed in the Guts, and which are of most Moment to us, instead of those which infest the Outside of the Body, the Knowledge of which is of no great Use. But as I am about to treat of the Origine of those Worms subject to human Bodies, as a thing certainly explain'd in the labour'd Controversies among the Learn'd, both of former and latter Ages, it seems wonderful to me, that of all those Worms, no external Form or Figure was known, or naturally describ'd; though the Worms were a long time observ'd and mention'd by Physicians, even from the Beginning of Physick.

THREE kinds of Worms were particularly known to the Antients; first, the *round Worm*; secondly, the *small Worm*; and, thirdly, the *flat Worm*. Of the two first, known at least by the Outside to the common People, there is no manner of Dispute of Moment; but as to what relates to the latter, there is a great Disagreement among Physicians, both ancient and modern, and no small Confusion in their Writings. To clear up these Things, the Proofs of both sides must be produc'd and discours'd on, that we may enquire as nicely as may be, whether any thing certain in such an obscure Business can be determin'd, and what is Matter of Fact. First, *Hippocrates*, or the Author of the Fourth Book of *Diseases*, ascrib'd to his Son-in-Law *Polybius*, makes Mention of the *flat Worm*, whose Authority may be consulted from his own Writings.

Now the Worm that is call'd by the Latin Interpreters of *Hippocrates*, *Lumbricus latus*, is by other Authors call'd; *ἐλμυς πλατῆα*; and also by *Aristotle*, distinguishing the three Kinds of Worms, viz. *Latus*, the *flat Worm* Teres the *Round*, and those call'd *Ascarides* the small Worms, which last, says that Philosopher,

sopher, does not breed. The *flat Worm* (see Chap. 2.) breeds in the Guts, and produces something like the *Gourd Seed*. But *Galen*, in few Words, treating of this Worm, denies that *Hippocrates* ever spoke of it; from whence we may infer that the Fourth Book of *Diseases*, before mention'd, ought not to be accounted a genuine Production of *Hippocrates*. But it will not be improper to hear *Galen* reasoning as well on this Kind of Worms, as on the other two, that the Difference he makes between them may be known. The *Ascarides*, says *Galen*, are certain small Worms, which breed particularly in the lower part of the thick Gut; and many of them brought forth, do manifestly appear in Cattle that don't digest their Food well, the Stench of, whose Dung is an evident Indication of the ill Digestion; but another sort of round Worms, or *Teretes*, breed more in the upper Guts, insomuch, that they even go up into the Stomach; but more of these than the *Ascarides* breed in Children. The Increase of the flat Worm is more rare, which is both the longest, and oftentimes extends itself through all the Guts; but of this *Hippocrates* makes no mention. In another Place, he says, there are three sorts of Worms that torment the Guts; some Round ones about a Span in length, or more, creep up almost to the Stomach; some short, and like small Worms, are call'd by the Greeks *ασκαρίδες*, and breed in the Intestinum Rectum, or straight Gut. Some are flat and oblong, insomuch that they reach through all the Guts, call'd by the Greeks, *κηλια* and also *ταυλας*, because they are like the *Fascia*. *Erotianus* also in *Gloss. Hippoc.* interprets *κηλιας* or *κηλιας* *ελμινθας*, *πλατειας*, though this Word is not to be found in the Works of *Hippocrates* now extant. But *κηλια*, and *ταυλα* signifie the same thing.

FROM hence Worms of this kind were likewise by the *Latins* call'd *Tania*, because they are undoubt-

edly like the *Tenia*, or *Fascia*, or Girdle-Worm, we shall find more distinctly hereafter; so they may also be call'd by the Greeks *κεσσοί*; since that, in the old Dictionary, *Lumbricus*, a Worm, is expounded *ἐλμινς κερσός*, where *Spigelius* observes that *κερσός* is corruptly read for *κεσός*; when *κεσός* with the Grammarians is *ἵμας ποικίλος*, that is a *Bridle of several Colours*. The same word *κερσός* is expounded by *Hesychius* *διακεκεντημένος*, painted so on the Top; in which Sense our Worm, like the little *Garter-Worm*, may for its exquisite Weaving, in some Measure be said to be painted on the top; though it hath nothing common with the *Cestus*, *Venus's Girdle*, in which there are the Enticements of the *Graces*; and *Cupid's Cingulum* is certainly the Name of any Worm of the flat Kind, of which hereafter; but the word *τανία*, from whence the Latin *Tenia* is deriv'd, seems to have been more common to the Greeks.

PLINT says, *The Tæniæ breed in Men to the Length of thirty Foot, and sometimes longer*. But in many other Places he seems to call all, Worms without Distinction, not *Tania*, but *Tinea*; by which Name those little Worms, that gnaw Cloaths and Books, otherwise call'd *Blata*, *Moths*, are nam'd by the *Latins*. As *Pliny* distinguishes these two Kinds of Worms, he calls sometimes the latter *Tinea Vestium*, Cloth-Worms, the former *Tinea Ventris*, or *Tinea interaneorum*, Belly-Worms; but the Word *Tenia* alone is often us'd by him for a Worm. So in his Twentieth Book, the 19th Section of the fifth Chapter; *Radicis Enula decocta succus tineas pellit*. The Juice of boil'd *Elecampane-Root* drives away the Worms; in which Place *Harduinus* says, *Tineas pellit* (*sive tæniās*,) it drives away Worms, or flat Worms: "The longest flat Worms, which are sometimes as long as the whole Gut are call'd *τανία*; the

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Antients call'd them both *Tania* and *Tinia*. This is what that most learn'd Man says, to whom I willingly submit, that the *Tania*, that is to say, the flat Worms, and also other Worms, were by *Pliny* call'd by the general Name of *Worms*; but from thence it does not follow that all *Worms* should be again said to be *Tania*, or all kinds of *Moths* or *Worms* should be call'd *Tania*. In that Place first quoted by me, *Pliny* speaks of *Tania*, flat Worms thirty Foot long; the Word is found in the small Edition of *Harduinus*, and other Books, *Tania*, not *Tinea*, when the Worms properly call'd *Tenia* are there treated of. Also the same Word is read in some other Places of the same Author, in which if we consider them, we shall easily understand *Pliny* speaks of the *Tania* properly, or the flat Worm, Book 27. Chap. 9. Section 55. I think no Body will deny this Author Treats of the *Tania* or flat Worm, which he endeavours to distinguish from other Worms; and the rather because *Fern Roots* are particularly recommended by *Dioscorides*, and others, against this kind of Worm. So in the 23d Book, Chapter 6th, Sect. 60, *Mali Punici radix decocta Succum emittit qui Tantias necat*. The Root of the Pomgranate boil'd emits a juice that kills the *Tania* or flat Worms. *Dioscorides*, almost in the same words, says, that the boil'd Root of the Pomgranate moves and kills *πλατειας ελμινθας*, as it is observ'd by *Harduinus* himself. Also in the 70th Sect. of the 7th Chap. of the same Book. The Juice of Mulberries loosens the Belly; draws away the Flegm that genders *Tania*, and other Worms. This and the Bark bruis'd are excellent Remedies. For the Bark of a Mulberry-Tree is said by, all the Antients to be very proper to expel the flat Worms, or *Tania*, and is prescrib'd as a Remedy against them. But in Section 59, of the 14th Chapter of the 28th Book, where these words are read, *Taniarum genera*

pellit cervini cornu cinis potus. The *Ashes of burnt Harts-horn drank remove the Tænia or flat Worms*, when he speaks not of the *flat Worms* only; other better Editions have it *Tinearum*, and not *Taniarum*, as in the Manuscripts, which *Harduinus* follows, and advises to be read. But I believe that it was the Fault of the Printer, and by an easie Transposition of the two first Vowels, that this *Taniarum*, or *Teniarum*, as they formerly writ it, was writ for *Tinearum*. Observe in the 45th Section of the 9th Chapter of Book 13. *Taniarum genera pellit sal in vino potus.* Salt drunk in Wine removes all sorts of flat Worms; when in other Editions 'tis read *Tinearum*, and more properly since that indeed, there are many sorts of *Tinearum*, that is, Worms; but there was but one sort or Species of the *Taniarum* or flat Worms, that seems to have been known by the Antients both Greek and Latin, from whence 'tis plain, *Pliny* could not speak of *Taniarum Genera*, the sorts of the *Tænia* or flat Worm, in the plural Number. But in all the other Places of the same Edition of *Harduinus*, in which the word *Tinea* is retain'd, either all the Species of Worms are signified without Distinction, as I have before observ'd, or only the *Teretes*, or round Worms. But in all Places in which the round Worm is particularly call'd by the Name of *Tinea*, this is the most remarkable, in the 28th Section of the 8th Chapter of the 26th Book. *Aizoi succus alvum fistit, & dysenterias, & Tineas rotundas pellit.* The Juice of *Housleek* stops Looseness and Bloody-flux, and removes the round Worms. *Dioscorides* says the same of the Virtues of the Juice of *Housleek* against *σπογγύλας ἐλμυδας*. For *Pliny* in this place calls them *Tineas rotundas*, round Worms, that he might distinguish 'em from the flat Worms, or *Tænia*; therefore the Name of *Tinea* was common both to round and flat Worms.

Robert

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Robertus Kenchenius, in his *Observations on Q. Serenus, Samonicus*, is not to be minded, when he says that *Tinea* in *Pliny*, (if it may be taken from all the Places above quoted) is writ erroneously for *Tenia*; and when he reproves *Gaza*, who, with *Aristotle*, in his fifth Book of the *History of Animals*, renders ἐλμινθας, *Tineas, Worms*; whom, being a *Greek Physician*, *Julius Alexandrinus* follows and interprets, as we shall see hereafter. There are Places in *Pliny*, wherein the Word *Tinea* ought to be retain'd, and others in which *Tenia*, not *Tinea*, is most proper, as we make it here evident. The same Word *Tinea* is not only us'd by *Pliny*, but is met with in many other *Latin Authors*, as *Serenus, Samonicus*.

(a) *Plinius Valerianus*, having a great Veneration for the Virtues of *Garlick*,
(a) Lib. 4. Cap. 17.
 says almost the same words, *Tineas & alia ventris animalia in mulso aceto coctum perimit, & expellit. Boil'd in Vinegar mix'd with Honey and Garlick, it kills and expels the Tinea and other Animals of the Belly.* So *Cato*, (b) says,
(b) De Re Rustica. Cap. 126.
Si Tinea & Lumbrici molesti erunt, &c. And also *Apuleius* mentions *Tinea* and *Lumbrici* in the Fourth Title of the 35th Chapter. *Scribonius Largus* treats of them both, that the Medicines, which by him are prescrib'd against the Worms, are the same that are prescrib'd by the other ancient Physicians, from whence it plainly appears that the *Tinea* of *Scribonius* are the same as the *Tenia*.

OF those Words that belong to Worms, *Tinea* seems to be the more general, so that this Name agrees with *Insects*, as I may say, of the Worm Kind; whereas the word *Lumbricus* chiefly denotes a *Belly-Worm*, and an *Earth-Worm*. So with the *Greeks*, σκώληξ, is a Worm in general; but ἐλμινς, *Lumbricus*, a Worm; indeed *Lumbrici terreni, Earth-Worms*, call'd by them γῆς ἕντερα, are by them reckon'd a-

mong the σκώληκας, but not among ἐλμινθας. But the small *Worms*, or σκώληκια have particular Names, so that those little *Worms* belonging to dead Carcasses, and others like them, are call'd ἐυλαῖ, and Moths σπῆτες.

BUT while the Names of *Worms* are treated of, we must observe, that to the flat *Worms* were added, the θηρίος, that is, hurtful or venomous Beasts, such as *Serpents*, *Scorpions*, *Spiders*, &c. or were call'd at least by the same Name. So *Cornarius*, and also *Foesius*, the Interpreters of *Hippocrates*, render θηρίον in a different Sense, animalculum, a little Animal. *Ælianus*, (*De Animal. Lib. 9. Cap. 33.*) also calls this Worm θηρίον and also ζῶον πονηρὸν; and the same Greek word is used by *Trallianus*, treating of the same Worm, as we shall see hereafter. But he marks down in other Places of *Hippocrates*, and also *Dioscorides*, by a more extensive Signification, of every kind of Worm troublesome to Mankind. *Celius Aurelianus* calls it θηρίδια. *Nicanor* in like manner, in his Writings of venomous Beasts, and of the Preservatives against them, calls it θηριακά; from thence also came the Name of the Antidote *Theriaca*. If we listen to *Ranchinus*, (in his Book *de Morbis Puerorum*) *Hippocrates* call'd the flat *Worm* form'd in the Intestines of a Fœtus, *Chordapsus congenitus*, born with the *Iliack Passion*: But here *Ranchinus* is very much in the wrong, as 'tis easy to shew, if 'twas worth while; for *Chordapsus* is the Name of a Disease, not of a Worm.

NEITHER must we omit the Difficulty rais'd by *Spigelius* about the Latin Interpretation of the Adjective πλατὺς, by which this our *Worm* is distinguish'd from others. It will perhaps, says *Spigelius*, seem strange to the more curious, that *Celsus*, the elegantest of the Latin Physicians, should interpret τὸ πλατὺ, latum flat,

Chap. III. of
his Book of the
flat Worm.

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flat. For though ἑλμινς πλατεῖα, the flat Worm, may appear sometimes twice or thrice as broad again as the round Worm, so that it may well claim this Name of the flat or broad Worm; yet such is its Length, that in Proportion to its Length and Breadth, the round Worm is much Broader and Thicker. The Fishes that Aristotle calls πλατεῖ, Pliny and others interpret plain, or flat, though they are almost as Broad as Long, &c. Therefore it will be just to interpret, πλατεῖαν ἑλμινθα, planus Lumbricus, the flat Worm. Thus Spigelius perhaps reproves Celsus, without a Cause; for if the Signification of the Latin word *Latus* may be two-fold, as here it is, the French word *Large*, *Broad*, was not only signify'd, but is in the same Tongue call'd *Plat*, *Flat*, which answers to the Latin word *Planus*. Certainly the Greeks had not a proper Word, at least not one so adequate, as to express the French word *Plat*. This Greek word indeed if we consider its etymology, answers; but its Signification in no wise is equivocal, for the Greek word πλατὺ signifies both Broad and Flat, in French *le Large* & *le Plat*. But the Worm of which we now treat, call'd the *Large* broad Worm, because opposite to the long one, is call'd by the French *Plat*, or the *flat Worm*, that it might be distinguish'd à *rondu*, seu *tereti*, from the *round Worm*. Therefore as the Signification of the Greek word πλατὺ was two fold, so the Latin word *Latus* might sometimes be taken for *Planus*, according to Celsus speaking of our Worm, unless we shall say, that he, in this Place, if we take *Salmasius* wrong, hath interpreted this Greek word, as he has many others. Whatever it is, our Worm is by all modern Physicians following, without doubt Celsus's Opinion, call'd *Latus*, not *Planus*.

Lib. de Homonymiis hyles jatri-
cæ.

B U T

BUT of these there hath been enough said:
 Tetra Bibl. 3. Now let us come to the other Greek
 Sermon. 1. Authors, who make Mention of the
 broad Worm. *Atius* speaks thus of
 it; The Worm which is call'd the broad Worm, is fre-
 quent in those People who are free from Fevers, and
 arises from Diseases of long Continuance. For a broad
 Worm, if I may call it so, is the changing of a small
 Skin within the Intestines into a certain living Body,
 that causes continual gnawings at the Stomach, and an
 insatiate Appetite to eat. For that which is receiv'd is
 not Digested, but Purg'd away. Leanness and Weakness
 of the Body and a continual Hunger, attended with La-
 ziness, are the Infirmities that follow. For that which
 lives in the Intestines, consumes the Aliment as soon as
 receiv'd, and afterwards gnaws, or presses upon the so-
 lid Substance of the Stomach and Guts: But the true
 sign is when something like Gourd Seed is voided with
 the Excrement.

Paulus Agineta says almost the
 Lib. 4. Cap. 57. same thing, The broad Worm is
 as I call it, the Formation of a Membrane breeding in
 the Intestines unto a living Body, and is often voided
 whole, so as to be of an incredible Size to the Spectators
 or comes away by pieces, so that when once it is come
 away it grows no more.

Alexander Trallianus writes thus
 Epist. Lumb i. of the same Worm; The broad
 cis. Worms sometimes grow to so large

Size, that they extend themselves through the Intestines

Lib. 7. Cap. 4. It is certain that they have grown some-
 times to be almost sixteen Feet long.

In another Place he says, I knew a certain Woman
 who when she had taken many Things, and that very
 immoderately, and yet Digested them all, would say, she
 was never the better satisfy'd, but felt a Gnawing
 her Stomach, and a Pain in her Head: I would have been
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take a purging Powder, which was Hierapicra; by the Evacuation of which she voided a Worm, which was thought to be upwards of twelve Cubits long, and then her raging and immoderate Appetite ceas'd. It then appear'd that it was not the Canine Appetite, but this Creature, call'd (*Onysos*) which oblig'd her to eat so much, and consumed it all.

LASTLY, *Actuarius*, a Greek Author of latter Times, makes Mention also of the broad Worm, in these words; *A broad Worm breeds in the Intestines, when a slow and lukewarm Humour swims on the inward Coat, or Superficies of the Guts, which Humour by a certain Heat is form'd into a living Creature.*

THUS much for the Greek Authors. Among the Latin ones if we observe *Celsus*, there are two sorts of Worms, not describ'd by him, but only nam'd, viz. the broad Worms and the round, the first of which, he says, are the worst: But it does not appear whether he comprehends under the round Worms the *Ascarides*, which, though very small, are round. Yet I believe that this kind of Worm was omitted by *Celsus*, since that, reckoning up the Medicines proper to expel all other sorts of Worms, he does not pursue such as are against those little Worms. There is nothing mention'd by *Pliny*, but those few things I before quoted; nor is there by *Scribonius Largus*, *Apuleius*, *Serenus*, *Samonicus*, *Plinius*, *Valerianus*, *Macrus*, or any other, the least Observation of the Shape of a Worm call'd the broad Worm, into which we shall now particularly enquire. Neither is there any thing more to be found in *Celius Aurelianus*.

THUS much for the Greek and Latin Physicians of the broad Worms, of which they mention but one Kind; so that they do not describe its Shape, contenting themselves to have observed Worms of that

that kind to be *broad, flat and very long*. Moreover it will easily appear to the Reader, in the following Sheets, that the Nature and Generation of those Worms was mistaken by them.



C H A P. II.

Of the three Kinds of Worms indicated by the Arabian Physicians; the round Worms; broad Worms, and small Worms. Of the broad Worms, otherwise called by them Cucurbitini. Of the confounding the Ascarides with the Cucurbitini, by the Interpreters of the Arabians. Of some Places in Petrus de Abano, and some other Authors, in which 'tis shew'd that the broad Worms gather themselves together, so as to form a Chain or Link of one Animal, or to make themselves one kind of Worm.

AS I shall insist on the Enquiry that I have begun, I pass from the *Greek and Latin Physicians*, to the *Arabian* and others the nearest their Time, in whose Writings there are some Discoveries that were not handled by the former. *Johannes Serapion*, an *Arabian* Author of the eighth Century, who lived in the Time of the Emperor *Leo*, in the Year of our Lord 742, says, *There are three Kinds of Worms, some of them long and round, and some little broad ones (or, according to the second Edition, and broad ones) and some little small ones, which are call'd by the Greeks Ascarides.* The long round Worms breed in the small

Guts,

Guts, viz. in the Duodenum, Jejunum, and Ileum. But the broad Worms breed in the Monocolon, or in the blind Gut, and in the Colon; but the little small ones in the Intestinum Rectum, &c. Nature hath divided the Moisture that is in the gross Intestines into small Parts, out of which many small Creatures are bred.

WHAT that filthy Mucus in the Guts is, we shall see more plainly in the following Chapter; and afterwards the other Obscurities which are laid down by Serapion, in these Words, shall be made evident. In the mean time we must observe the two Kinds of small Worms expressly distinguish'd by him; of which the first is the little broad Worms, the second the little small ones. But here the Difficulty arises from our Author's saying, in the Place quoted, that the little small Worms are the same with the Worms that are by the Greeks called *Ascarides*; and afterwards from his distinguishing expressly the *Ascarides*, otherwise call'd by him Cucurbitini, or Gourd Worms, from the small Worms: The *Ascarides* or Cucurbitini, says Serapion in the same Chapter, and the small Worms, cannot be hid nor remain long, and they are voided swiftly and from the first of their breeding for four Causes; the first is, by Reason that they are nigh the Anus; the second is, because of the Fulness of the Gut, (for a wide Passage expells with Ease whatever is retain'd in it, whereas a straight one retains what is in it) the third reason is the Smallness of those Worms; and the fourth is, because those two Kinds of Worms are weak, and are not stay'd so fast to the Guts as the long ones are. This Place of Serapion cannot agree with the foregoing Passage, unless we say, that the word *Ascarides*, which is not to be found in the Original, was, as I suspect at least, in the last Place, added by the Translator. A Place

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Place in *Avicen* strengthens this Conjecture, where the same being not extant in the *Arabian* Copies, is indiscreetly inserted by the Translators.

Lib. 3. Fen. 16. Tractat. 5. Cap. 1. and 2. Edit. Juniarum. 1608. OBSERVE *Avicen*'s words, according to the Latin Interpretation. *Species Verminum sunt quatuor; longi & lati (vel magni, secundum aliam lectionem) & rotundi & lati, & sunt Ascarides & parvi.* There are four Species of Worms; the long and broad (or according, to another Edition, the Large) and the round, and the broad, and the *Ascarides*, and little Worms. *Manardus* attempted to explain this very obscure Place, and after him *Mercurialis*, whose Words are these; *Almost all the Interpreters of Avicen think he reckon'd four sorts of Worms; but I am of Manardus's Opinion (in the first Chapter of his Physical Epistle) that there are only three kinds of Worms, viz. The round Worms, which are call'd by the Avicen, the long and the round; the Ascarides, which are call'd by the same Avicen, the little and the small; and also the broad Worms, which are call'd by him, the long and the broad; so that we may say some Worms were long, some little; again, that some long Worms were round, some broad, but that the little ones were the Ascarides.*

THUS much for those two Authors, in endeavouring to no purpose to reconcile *Avicen* with the *Greeks*, with whom we may add a third, *Hieronymus Gabucinus*, who professes himself of *Manardus*'s Opinion, and a fourth *Hippolitus Bryllus*, who seems to come the nighest to *Avicen*. But the Learned had sav'd themselves much Labour, and also might have put an End to all this Controversy, if they had thought of consulting the *Arabian* Text of *Avicen*, either by itself, or the Translati-

on of others. I learnt of a very learn'd Gentleman whom I consulted, not a Phylician, but a Divine very well vers'd both in the *European* and *Oriental* Languages, that That Place of his ought to be translated from the *Arabick* into the *Latin*, thus; *Species vermium sunt quatuor; longi, magni, & rotundi; & lati, atque bi grana cucurbitæ & parvi* Therefore if this Interpretation is admitted, the true Sense of *Avicen* might easily be understood. For from thence it appears, first, that the Name *Ascarides* is not to be met with in the *Arabick*, but in the old *Latin* Translation, *granorum cucurbitæ, seu vermium cucurbitinorum*, is erroneously apply'd to the Place, when, without doubt, the *Gourd Worms*, at the time of this Translation, were, as we shall see hereafter, call'd by another Name, *Ascarides*, or confounded with the *Ascarides*, though they differ'd very much from the *Ascarides* of the *Greeks*. Secondly, We must observe, that the Obscurity of that Place in *Avicen* arose chiefly from those words; *atque bi grana cucurbitæ*; for the Translators believ'd a new Species of Worms, besides the other three mention'd by the same *Avicen*, was signified by these words; and these very words were, without doubt, added by the Author, by way of *Parenthesis*, to indicate the Likeness of the broad Worms to Gourd Seed; from whence *Brylins* rightly imagin'd, that one Kind of those Worms, that is, the broad Worms, was reduced by *Avicen* to another Kind of Gourd Worms. This being laid down, it will appear, that only three Kinds of Worms are distinguish'd by *Avicen*, so that he does not follow the Division laid down by the *Greeks*, as the Learned thought, but agrees with *Serapion* in every thing, on this Argument. The first sort of *Avicen's* Worms, are the long, large, and round, which *Serapion* call'd the long round Worms. The second sort,

fort, were the *broad Worms*, which *Serapion* also call'd the *little broad Worms*, or only *broad Worms*; *Avicen* adds, (*atque hi grana cucurbitæ*) that is, *hi* signifies *lati*, *grana cucurbitæ*, vel dicuntur, quia grana seu seminibus hisce forma similes sunt. The third Sort of Worms were the small ones, which the same *Serapion* calls the *little slender Worms*, which are the same with the *Ascarides* of the *Greeks*. Those two Authors agree about the Number of Kinds of Worms, and the Names of each Kind, only there is this Difference, that the Worms which *Serapion* calls *longi rotundi*, *long round Worms*; *Avicen*, adding the word *Magnus*, calls *longi, magni, & rotundi*, *long, large, round Worms*, because indeed the Worms of this Kind are much larger than the two latter, which are small, and differ in the Length: But *Serapion* was two Centuries ancients than *Avicen*. There remains a fourth word, which may finish the Business, by which the Number of these Kinds of Worms is expressly denoted, which word is also to be found in the printed *Arabian*, and in the *Hebrew Version*. *Gabucinus* makes Answer in the Place spoke of before, that in some Copies they are read three sorts, not four, but does not inform us what Languages they are writ in. However it, is very likely that the Word *four*, might, by the Carelessness of the Printer, be put for three, whether they were led into an Error by these words, (*& hi grana cucurbitæ*) which ought not to have been put in a *Parentthesis*, or by any other means, they here describ'd the fourth Kind of Worms distinct from the *broad Worms*. As *Gabucinus* very justly observes, there is nothing in this, and the following Chapter of *Avicen*, whereby we may be certain that he distinguish'd four Kinds of Worms. Indeed, in another Place, this *Arabian* Author gives a Hint of the Worm of the Median Vein, which may indeed constitute a fourth Species to the other three,

three, but does not reckon it into the Number of Worms; neither, if he did, wou'd he confound it with the Worms of the Bowels, of which there is a Discourse in the Place before quoted.

MOREOVER I omit referring to the two Chapters of *Avicen* before quoted, of Worms, when I find almost the same things better explain'd in *Serapion*, from whose Writings I have made Choice of those that relate to the Difference of Worms. The other *Arabians* I lay aside till I can spare Time and Paper, and shall only observe, that they distinguish'd three kinds of *Belly Worms*, and no more; from whence we may probably infer, that *Avicen*, their Chief, did not exceed this Number.

Petrus de Abano, call'd the *Reconciler*, who flourish'd in the Year of our Lord 1300, follows the *Arabians*, from whom we have some Choice things worthy Observation, and which make us better acquainted with the flat tape Worm of the *Arabians*. We must know, says the *Reconciler*, That a Worm is an Animal bred from Putrefaction enliven'd by the Heat of the Belly. There are three sorts of Worms, nam'd the flat, and round, and the third, *Ascarides*. Of these, indeed, there is no other; the flat Worms only remain in the Guts, and appear like *Coloquintida* Seed. Also three Sizes are commonly laid down; for some are long round ones, as Serpents, like Purslain-stalks, as Worms, long breeding in the small Guts; and some flat ones, like Gourd-Seed; from whence they are call'd *Cucurbitina*; also in the first Gut like Gourd-Seed, joyn'd one to another, which by some are call'd *Ascarides* and *Buffones*; breeding in the great Guts, and extending themselves through them all, insomuch that they come up into the Stomach, making the Person ravenous for Food. For there are some of a very great

Length, when bound together; so that a certain Person told me he voided a Link of them fifteen Foot long. The third sort, or little ones, which remain, call'd the small Worms, are like Worms in Vinegar and Cheese, breeding in the Intestinum Rectum, and so small that they are scarce to be seen by the naked Eye.

HENCE we gather, that he gave the *Cucurbitini* the same Name of *Ascarides*, or advised them to be call'd by that Name, though they are altogether different from the *Ascarides* of the Greeks, that the same Author made mention before, and which at the end of that Place he calls, little or small Worms. He himself concludes, that all Authors differ something as to the Name of Worms. This conclusion of Names, in regard to the *Ascarides*, is not to be imputed to the *Arabians* themselves, but to their first Interpreters, as appears by *Avicen* and *Serapion*. *Gordonius* also says, that they are call'd short broad Worms, otherwise *Cucurbitini*, or *Ascarides*, calling the *Ascarides* of the Greeks, *curtos graciles*, short small Worms, without taking any notice of the Greek Appellation. But the chief Difference regards the Thing more than the Name, because it pertains to the broad Worms. The broad Worm, if we mind the Greeks, is a certain flat Animal, or Insect of a vast Length, sometimes extended from the lowest Gut up to the Stomach. I say an Animal, the only one of its own Species like itself, which lives in the Guts, and if we credit *Hippocrates*, doth not breed. *Tinea una lata in intestinis gignitur*, One broad Worm is bred in the Guts; and *Actuarius*, says, 'tis distinguish'd by that Name from the other Worms, which are many: The other Greeks before quoted, do not differ much from them, though they have not writ so elegantly. Among the Latins *Pliny* seems also to agree with them. But if we believe the *Arabians*, indeed the broad Worm

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Worm is allowed, but 'tis that which also is little; or if the first Reading of *Serapion* is not admitted, 'tis only the *broad Worm*, not the long one. The same *Serapion* seems to show, tho' obscurely, what may happen to these sorts of Worms (no where observ'd by the *Greeks*) and why they appear sometimes long, in these Words spoke before. *The broad Worms are bred broad, because they lie and press upon one another.* But the *Reconciler* affords us the greatest Insight into them, by the Words just before cited.

THERE is a Reason for the Length of this kind of Worms; these Worms taken separately by themselves, are not long, but many of them joyn'd together, constitute that Worm, accounted by the *Greeks* to be only one Worm, (unless they saw another kind,) of which hereafter. *Calius Aurelius* seems to be of the same Opinion, when he observes before, that these Worms are found sometimes joyn'd together in the Likeness of a Ball, sometimes many bound together in a Link, and sometimes single; but this may be referr'd to the round Worms, which we often see voided by Children in Knots.

THADÆDUS, who was almost of the same time with him, the *Reconciler* approves of his Opinion, asserting, that the *Cucurbitini* are long, by reason of the Continuation of many Worms together; and that they are bound together, as if they were the Seeds of a Gourd united by Threads. Neither doth *Nicolaus Florentinus* differ from him (in his fifth Discourse of the eighth Treatise of the 53d Chapter) whose Words are these; the broad Worms are joyn'd, as if they were ty'd together by a small Cord, in a Rope, or Chain, wherefore it appears as if it was one broad long Worm. *Johannes Michaelis Savonarola*, a Physician of the fourteenth or fifteenth

In his Commentaries or Aphorisms, Book 3. Conn. 26.

teenth Century, is also of the same Opinion, commending the Place of the *Reconciler*, and also *Joannes Arculanes* (in the 9th Book of *Rhasis*) says, *The Cucurbitine Worms sometimes being joyn'd together like Gourd-Seed, are found in Length according to the Stature of the Person.* With these also may we add *Alexander Benedictus*, a Writer of the fifteenth Century. *Cornelius Gemma*, first took care to have that same Continuity painted in the sixteenth Century, but the Likeness set forth by him is not very accurate. Observe his Book *Of the Secrets of Nature*, and the Figure set by him, *Table. 5. Fig. 2.*

Characteri-
sticks, or Distin-
ctions.



C H A P. III.

Of the two kinds of Broad Worms, distinguish'd, but not described by Arnaldus Villanovanus; the one, the long broad Worms; the other, the short broad Worms, or the Cucurbitini. To these belong Thirdly, the long round Worms, or Teretes, Fourthly, the short round Worms, which are the Ascarides of the Greeks; Fifthly, the large Worm, otherwise call'd Solium, or Cingulum. The Place of Gabucinus, from whence we gather that large Worm of Arnaldus, is nothing but a Bag; containing sometimes the Cucurbitine Worms. Of the great Mistake of Gabucinus, reckoning this Bag for the broad Worm of the Antients.

BUT before we have done with the latter Ages, let us hear what Novelty Arnaldus Villanovanus, a Writer of the Fourteenth Century, broaches. There are, says he, various Kinds of Worms, according to the variety of the Slime or Mucus from which they are bred; the long round Worms, are bred from salt Flegm; the short round Worms, from a sharp Flegm; the long broad Worms, from a sweet Flegm, and the short broad Worms, which are call'd the Cucurbitini, for they are made like the Gourd Seed, from the natural Flegm, or Mucus; and some say, that these Cucurbitini are bred in the Belly of a large Worm, call'd Solium,

Chapter 21.
of the 2d Book
of his Abridg-
ments.

Solium or Cingulum, which is voided sometimes a Yard or two long. Other large Worms have

In his first
Chap. of his 4th
Book of Medi-
cinal Epistles.

also been made Mention of. Manardus, a Writer of the fifteenth Century, says, an honest Matron, and to be credited, vouched, that she saw many little Worms, like Gourd-Seed, in a large Worm, that her Grandmother, when Sick, voided.

In his Com-
mentary on
Belly-Worms.

Gabucinus, of the following Age, explains the Matter more clearly, in these Words: I think the broad Worm to be nothing else, as Hippocrates says, than the white Scourings of the Guts within, which living Creatures, like Gourd-Seed, are bred, which seem to be discharg'd when the whole Slime of the Guts is not voided with them, but only Part of it, which may be seen very often; but the whole is very seldom voided: It comes away very frequently in pieces; if it is broke by Excretion, then you may see those Worms like Cucumber-Seed discharged separately; sometimes you may see many complicated together, sometimes a few; but if any one saw all that animated Slough, he does not suppose that that Slough, or Slime, call'd the broad Worm, is alive; but that the living Creatures, like Cucumber-Seed are quickned within it. I formerly saw this Worm, which a certain Woman voided in a Quotidian Fever, of a vast length, panting and moving. And when I survey'd it as well as possibly I could, there came another Person, in few Days after, who said he had voided a piece of a broad Worm worth Notice; which he shew'd with an incredible Desire, as a Wonder. This piece also moved, whereby I became more desirous to look into the Cause of its Motion; at last examining it diligently, I saw through its whole Cavity, that a Series of moving Animals caused that Motion, which Animals came forth as if they came from a Bed, sometimes one, sometimes two bound together, for the most part four

four or more; and that piece of Slough, which was emptied by these Cucurbitine Shreds enliven'd, never moved, but laid still: Wherefore I take the broad Worm to be nothing else but a Mucus bred within the Guts, or a filthy Flegm thicken'd by the Coldness of the Intestines compassing the Guts on the inside, like a Coat of Mail, which Gossipping Women call Worm-Beds. From which filthy Matter the Animals, which are like Gourd-Seed, are produced after the manner of a Conception, which is cover'd close on all sides by the secundine Membrane, generated first within the Womb from the Semen. Avicen approves of this Opinion in these Words; they are both broad and round, as if they were produc'd from those Viscosities, fix'd in the Superficies of the Guts, which Viscosities are comprehended in the Mucus Slime that covers them, as if they are bred from it, and putrife in it. Thus far Gabucinus, explaining the Nature of the Conduits or Bags that sometimes enclose the Cucurbitine Worms; more plainly from Avicen, and Serapion, whom we heard before; and also from Arnaldus Villanovanus, and Manardus; but he is mistaken in it, because he took this Bag for the broad Worm; indeed a great Mistake, when he himself observed that that same Bag neither liv'd or mov'd of itself. Perhaps the Word *Latus*, taken in the proper Sense, may subject the Text to a Mistake, as if this Worm, was indeed the broad Worm, not the flat Worm, which equivocal Signification Spigelius makes Mention before: Every broad Worm is indeed a Bag, a broad Tunicle; for truly the Tunicle, in which this sort of Worm is inclosed, is seen sometimes very broad; For Instance, Pereda says, he saw it so hollow that he cou'd put his whole Hand into it. And Hollerius relates the same thing, but more of this hereafter.

Arnaldus Villanovanus seems to distinguish all five sorts of Worms, first, the long round ones or the

Teretes; secondly, the *short round* ones, which are the *Ascarides* of the *Greeks*; thirdly, the *long broad Worms*; fourthly, the *short broad Worms*, or the *Cucurbitini*; fifthly and lastly, the *large Worm*, or the *Solium*, or *Cingulum*. But laying this *large Worm* aside, which is neither a *Worm*, nor an *Animal*, there remain four Kinds, two of which are the *broad Worms*. Of these again, some are the *Cucurbitini*, which the *Arabians* and their Followers have already spoke of; and some are the *long round Worms* indicated by *Arnaldus*, but not described.



C H A P. IV.

Of the great Confusion in the Writings of the Modern Physicians, about the Nature of the broad Worms, and of their Disagreement. Of certain Persons who thinking that the Cucurbitine Worms were forg'd by the Arabians. Of others saying whatever is related of the broad Worm, is a Trifle. That some others seem to allow of the two Kinds of broad Worms, but that they know not how to distinguish them asunder. That some, of whom Platerus is the chief, expressly distinguish two Kinds of broad Worms, or Tænia, and do describe the broad long Worm different from the Chain of the Cucurbitini, but take, contrary to the Opinion of Petrus de Albano, this Chain, call'd by them a Tænia of the second Kind, for one single long Worm; and say, that the broad short Worm of the Arabians, or the Cucurbitinus, is nothing but the Fragments of the Body of the Tænia, like the Seeds of a Cucumber. Of others, lastly, who after having seen the same Cucurbitine Worm, took it for the Ascarides, or some other monstrous Worm; so that the Cucurbitinus hath been a long time unknown, and buried in Oblivion.

IT will plainly appear from what follows, that two Kinds of *broad Worms* are indeed allow'd of; but the Difficulty is to regard them separately, and to describe them particularly, and distinctly,

stinctly; but 'tis wonderful how the following Age has been embarrass'd in this Argument. Certainly among those Physicians, who were contemporaries with *Gabucinus*, or something more modern, there is nothing to be met with in any of them, though of great Reputation, which we may depend on; indeed some of them, among whom *Hieronimus Mercurialis*, otherwise a very learned Man, and of great Experience, thought that the *broad Worm* was a feign'd Worm, and something like an *Animal*, as it appears from his *Book of Diseases of Children*. Book 3. Chap. 1.

FROM this any one might gather that *Mercurialis* would demonstrate in the following Discourse what he here promises, to wit that the *broad Worm* was not properly an *Animal*. But no such thing is found in the seventh Chapter, in which he treats of the Difference of Worms. Indeed in this Chapter this learned Man denies that the *broad Worm* bred another like itself, and asserts that all other Worms have this Peculiarity, that they do not breed other Animals; which Notion he has from *Aristotle*, who says, there are three Kinds of Worms, and that which they call *Ascarides* from which there is no other bred. For when the *broad Worms* are said, in the same place, to bring forth something like *Gourd Seed*, the same *Mercurialis* thinks, that the Philosopher did not mean that those Worms brought forth an *Animal* but something else. Therefore he says, that the Excrements appear like *Gourd Seed*, because the *broad Worm*, being broke, either by the Strength of Medicine, or in the voiding, is divided into these small pieces, which are like the *Gourd Seed*: But he does not explain what the *broad Worm* is; though he said a little before, that it proceeds from the same Matter as the others do, but 'tis very rare; concluding at length from all these, and chiefly

chiefly from that Place of *Hippocrates* before mention'd, in which 'tis denied that any Animal can bring forth so many *Fætus's*, or Births, as appear like the *Seeds* of the *Gourd*, or that there is room enough in the Guts to contain so many *Fætus's*, &c. concluding from these things, I say, that *what the Arabians say of Cucurbitine Worms is a Trifle, since there are no such Worms.*

Antonius Scarellus goes farther, who is an Author unknown to me, but is commended by the famous *Antonius Vallisnerius*, in a small Treatise of his, lately written in *Italian*, of the Origin of Worms, That large Worms, says *Scarellus*, is in my Opinion a Fiction, and a very great Imposition; for of all the Authors that I have read, I never observed, that any one affirm'd that he had seen it with a Head, made strong as the Tail, nor alive and whole; but that they had all seen pieces of a Fillet, or Covering, which had some Resemblance to that of Worms.

BUT others, who thought that there was such a Worm as this, being doubtful and uncertain, have writ very little on its Nature and Form. Among these we may reckon the celebrated *Fernelius*, whose Opinion of all kinds of Worms may be seen in his Book of the *Diseases and Symptoms of the Parts*. Book 6, Chap. 10.

THUS *Fernelius*, who treating of several Kinds of Worms, though doubtful whether he shou'd admit of three or four Kinds, first says, They are various; though in the Description of them separately, he seems to add to the three Sorts of the *Arabians* a fourth, and so to distinguish their four Kinds together. The first Kind is the round Worms, the second is the broad short Worms, like the Seeds of the *Gourd*, which he observes to stick to one another, by a strange kind of Continuity. Hence dividing that Species, as in two Parts, thus he goes on;
some-

Sometimes by their mutual cleaving and frequent uniting one to another, that broad Worm is wove together, &c. Who wou'd not gather, from these Words, that the *broad* and *long Worm* constitute a third Kind, different from the *Continuity of the Cucurbitini*, which cleave together; to which if we add the *Ascarides*, there will be four Kinds of *Worms*; but if *Fernelius* thought otherwise, he ought of necessity to have acquainted us that the *broad long Worm* was not one single one.

Bartholomæus Perdulcis, a Follower of *Fernelius*, describing the three different Kinds of Worms only according to the Opinion of the *Arabians*, speaks more plainly. With whom *Marcellus Donatus*, *Ulysses Aldrovandus*, and some others also agree. But *Forestus*, a Contemporary with *Perdulcis*, being undoubtedly led into a Mistake by *Fernelius* and *Rondeletius's* speaking more obscurely of this Matter,

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whose Words also he produces, endeavours to get out of this Labyrinth. Some, says *Forestus*, according to *Rondeletius*, thinks there are four Kinds of *Worms*, viz. The round long Worms, and the little white Worms, like Cheese-Worms: The third Kind is that which from its breadth is call'd the broad Worm; by some 'tis also call'd *Tinea*, for the Greeks call'd a long white Tape, or Rowler, *Tinea*. This Worm in breadth, is three, or four, or five Fingers, and is extended according to the length of the Guts, that they are sometimes longer than the Guts themselves, so that, as *Pliny* relates, they are thirty Foot long or more.

THUS far *Forestus*, who using the Words of *Rondeletius*, which are annex'd to that place of *Fernelius's* above quoted, and being uncertain what he should conclude from thence, whether he should illustrate or obscure the Argument begun, thus goes on. *Valeriola* saw a tape Worm above nine Foot long:

To

To these also some add a fourth very long, and call it a tape Worm, though it may be comprehended under the broad Worms; so they distinguish the Gourd Worm from the broad, because they have no Brood, as some think, nor the Parts of an Animal, when they are perfect Animals. But Fernelius ascribes the broad Worms to the Gourd Worms, and to the Ascarides; so there are not Persons wanting, who lay down five Kinds of Worms, and distinguish them separately; the Round ones in the upper Guts, the Tape, the Long, the Broad and the Gourd-Worm, extended through the Guts, though some will have the Gourd-Worms to proceed from the broad Worm, which others deny, and the Ascarides near the Anus. In which Division it is no wonder that there is Confusion and Controversy, since it is not taken from the Nature of the Thing, and the Members may be intermix'd.

INDEED Forestus, as it will appear to them that read his Conclusion, understood all these things as confused and dark; but could not as it was likely, dispose them in Order; in either does Hollerius in almost the same Words speak less obscure on these Worms.

SOME others have prosecuted this Argument something more exactly, among whom Felix Platerus of Forestus's Time, who hath describ'd, with more Circumspection than all the Authors before mention'd, the broad long Worm different from the Link of Gourd Worms, of which hereafter; but I know not how both Platerus himself, and his Followers, by whose Writings this new Kind of broad Worms, became known, have cast a fresh Mist on the other, accounting the Continuity of Gourd Worms, that stick to one another, only one single Worm, form'd after the manner of the Tape Worm, against the Observation of the Reconciler and other famous

famous Physicians, who writ before *Fernelius*, *Rondeletius*, and *Foreſtus*.

NEITHER does the Miſtake lie here, for while that fictitious Inſect is obtruded on us, the real *Gourd Worm* ſeems almoſt to diſappear for a long time, in which there were many things writ of *Worms*; ſo that if you conſult almoſt the Phyſicians who writ from the time of *Platerus*, near to the End of the Seventeenth Century, you ſhall hardly know how it came about.

BEGINNING with *Platerus*, I ſhall obſerve to him two Kinds of *Tape Worms*, the firſt of which I ſhall hereafter treat of; the latter is deſcribed by him in his *Treatiſe of the Excretion of Animals* Chap. 14.

Horatius Augenius, ſomething more modern than *Platerus*, as being one who writ at the latter End of the Sixteenth Century, ſays, he declared in a Tract of *Worms*, written by him, *Epift. 33. Book 6. Whether there was one Worm, or more which remains in the Mucus*. I have not ſeen that Treatiſe; neither are thoſe things, which are added by a very learned Gentleman, apparent in theſe Words of the aforeſaid Epiftle. *The length of this Worm was five and Twenty Cubits; when alive it moved; it was the breadth of one's little Finger; and there were above a Thouſand Gourd Worms ſticking to that Mucus or Membrane; and it ſcarcely liv'd an Hour*. This ſeems to come nigh *Gabucinus's* Opinion.

BUT perhaps *Hercules* the Saxon, his Cotemporary, was his Interpreter. Before I explain to you the Nature and Cauſes of *Worms*, I have reſolved to lay before you their Kinds as ſhort as may be, that you may eaſily be verſed with the Greeks and Arabians: Since that if we have regard to *Hippocrates* and *Ceſus*, there are two Kinds; if to *Galen* three; if to *Avicen*, ſometimes three, and ſometimes four. The

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Authors are easily compared, but what are these Kinds; for some are call'd long, some broad, of which Hippocrates speaks in his fourth Book of Diseases. Hippocrates, in the 26th Aphorism of his 3d Book, calls these broad Worms 'Ασκαρίδας, so that the broad Worms and the Ascarides, are within the same Kind; but those broad Worms are inclosed sometimes in a Membrane; sometimes they are separated, and inclosed in no Membrane. When they are wrapt up in a Membrane, this Membrane sometimes cloaths all the Guts with an inward Coat, and those Worms are extended according to the length of this Membrane, so that one seems to hold fast of another, by Biting; and thus they make one Body, which is sometimes above 5, 8, 10, or 12, or sometimes more Cubits long, and one I my self saw above ten Cubits long.

BUT this Worm is in Figure, Length, and Smoothness, like a piece of Tape, and being thus compos'd, is call'd by the Greeks sometimes ταινία, sometimes χείρα, and sometimes ἐλμινς πλατεία, that is, the broad Worm, which is not different from the Ascarides; unless that those Ascarides are separate, and without any Membrane, and these inclosed within this Membrane and hold together. Galen, in his 26th Aphorism of his 3d Book, adds a fourth Kind of Worm; sometimes this broad Worm is broke into little pieces, which are call'd Gourd Seeds, and are voided by the Guts for a little while. This Worm is inclosed in a Part of that Membrane: Therefore there seemed to be a fourth Kind, which the Arabians call'd the Gourd Worm; but it is rather a piece of the broad Worm; and the broad Worm is compos'd of the Membrane of the Ascarides. Therefore, as I said, there are only two Kinds of Worms; which may be call'd three, and four. I have spoke of the first, because the long Worm comprehends under itself a great many very proper Kinds. For there are long Worms which have Feet; others that are Hairy; some

Some have an Head with Horns, as you may read in Marcellus Donatus, &c.

HE was indeed a very learned Youth, well versed in Physick, who in reading this Place of the Saxon could expound the Writings of the Greeks and Arabians, or reconcile them. He certainly in his Commentary, affirms first, that the *broad Worms* and the *Ascarides* were with Hippocrates one Kind, which he ought not only to affirm but to demonstrate; secondly, that the *Ascarides* retain the proper Name but, when they are wrapt up in a Membrane, and are extended, as if they hung up by the Teeth according to the length of that Membrane, then they make the *broad Worm*; but when this *broad Worm* is broke, then the small Pieces, which they call *Gourd Seed*, are voided. A very learned Person adds, that a little Worm is inclosed within the Piece broke off, so that there appears a fourth Kind of Worm (if the *Teretes* are join'd to the three mention'd) which the *Arabians* call the *Gourd Worm*; tho' indeed it is not a fourth Kind, but only a part of the *broad Worm*, if the *broad Worm* is compos'd of the Membrane and *Ascarides*. But the last Word of the Saxon gives Light to the Place of *Augenius*, for they are both in an Error, tho' they both seem to come up to the Opinion of the *Arabians*, which is that the *broad Worm* is not one single Worm, but many, mutually join'd together; and partly the Opinion of *Gabucinus*. Also *Æmilii Campolongus*, a Student in Physick at *Padua*, at the same time with the two former, and who writ of *Worms*, handles this Argument so nicely, and

The 1st Chap.
of Worms.

he seems to side either with the *Romans* or the *Arabians*. Those *Worms* (meaning the *broad Worms*) says *Campolongus*, are broad and very long, so as to be three or four Cubits long, and are so wonderfully folded, that if

you

you saw them, you would say they were rather Cords than Worms, &c. But his Ignorance of those very long Worms appears from the foregoing Words; in which being supported by the Authority of Aristotle, he asserts that the Gourd Worms are rather the Excrements of the broad Worms, than Worms themselves.

BUT Spigelius is altogether of Platerius's Opinion, who writing after Campolungus, treated particularly of the broad Worms; such a length, says, Spigelius (speaking of the length of Worms described by Cornelius Gemma, as we have observed) is not composed of many Worms sticking together, as some Authors dream; but is one Worm compos'd of many Knots and Foynts like Cucumber Seed, &c. Of the Physicians that succeeded Platerus and Spigelius, the first we meet with is Sennertus, Contemporary with Spigelius, but one who writ after him. This Author agreeing with Spigelius in all things about the second Kind of tape Worm of Platerus's, speaks thus; The other Kind of tape Worm is scarcer; yet its Parts when alive, resembles more exactly and apparently Gourd Seed, such a Kind Platerus describes in his second Part, and Cornelius Gemma, in his Book of the Occult Observations of Nature,; which kind of Worm consists of many Parts, which singly resembled Gourd Seed. Neither is it observed by Authors that Worms of this Kind are found so long, as in the former.

In the sixth Chapter of his Book of the broad Worm.

Book 3. Part. 2. Sect. 1. Chap. 5. of his Practice of Physick.

RIVERIUS, about twenty Years younger than Sennertus, puts the same Question, demanding whether the Worm call'd the broad Worm was one single Worm; or compos'd of a great many little Worms united together? But he does not resolve it, leaving the Reader to the Authors, that handled this Argument.

ment. Neither do you find *Ranchinus*, though prolix enough on Worms in his *Book of the Diseases of Children*, say any thing on this Subject. But *Franciscus Sanchez*, a Contemporary of *Riverius*, believed this Worm to be but one Worm, nor compos'd of many united together, as we may gather from the following Figure set forth by him, tho' better than the Figure of *Cornelius Gemma's*, yet it will appear rough before the others, of which hereafter, *Vid. Tab. 5.*

YOU find nothing said on this Argument, among many more modern Practitioners, who writ from the middle of the Seventeenth Century last past, to the very End of it, as *Willis*, *Sylvius*, *Sydenham*, *Ettmuller*, &c. In some others there are only a few things read; as in *Jonston* (in his *Universal Treatise of Physick*, Book 5.) who seems to come up to *Platerus* and *Sennertus's* Opinion; in *Paulus de Sorbait*, who makes Mention of the broad short Worms sticking together, in two Words; therefore he is reckon'd among the aforementioned followers of the *Arabians*: and so much the more, because he says nothing of the other Kind of Worms, from whence we may Collect this was known to him. Neither was it more known to the most celebrated *Wedelius*, who also agreeing with the *Arabians*, observes that the Worms call'd *Gourd Worms*, were not so much one Worm, as many joyn'd together, so as to extend themselves two or three Foot long, or more; he also affirms that he, who was not one easie to be deceiv'd, observ'd the tape or the broad *Gourd Worm* to be real Worms, and many gathering together, though in common Discourse, they may be call'd one Worm. And the most illustrious *Zwingerus*, in his *Practice of Physick*, asserts the same thing. But among those, who penn'd their curious Physical Observations together, we may reckon the learned
Georgius

Georgius Francus, whom whether I should reckon among them that accounted the second *tape Worm* of *Platerus's* for one single Worm, or among the others, I cannot determine. Afterwards this learn'd *Francus*, seems to shew that the *Worm* which he calls the *Gourd Worm*, is nothing but a link of *Gourd Worms*, and therefore a heap of many Worms, so that he ought not to say *Gourd Worm* in the singular Number, but *Gourd Worms* in the Plural; but many others have said so, as we have already seen. Every one that heard him speaking of the *Ascarides*, voided upwards and downwards by the Child, which he spoke of, may understand that he was certainly ignorant of the true *Gourd Worms*; for they were not the *Ascarides*, but the *Gourd Worms*, by this Token that they were partly voided at the Mouth, whereas the *Ascarides* come forth only at the *Anus*, to which they are wont to adhere. But the *Gourd Worms*, when they are voided loose, or alone, are sometimes so frightened, that they seem not to be much bigger than the *Ascarides*, or at least by bending their Bodies were like them; and this might occasion *Francus's* Mistake; unless we say, the Fault's in him, because, having follow'd those Authors spoke of before, that he confounded the *Ascarides* with the *Gourd Worms*, and placed them two under one Kind.

THERE were others, who did not know the *Gourd Worms*, when they saw them; the *Gourd Worm*, unless I am Mistaken, were those Worms which were seen at the same time by *Schrockius*. But the Worms this Author speaks off, were not so monstrously singular; for it appears by the Figure set forth by that Author, that they were not different from the *Gourd Worms*; neither know I what Microscopes he us'd, only I know this, that the famous *Vallisnieri*, of whom I shall speak hereafter

saw more plainly than *Schrockius* the Heads of the *Gourd Worms*, and describ'd their inward Parts. For 'tis no wonder that this learn'd Author had not thought of the *Gourd Worms*, which without doubt he had never seen before, when they were very rare, and had not, as 'twas likely, been nicely represented, or described by any in his Time. Therefore it might be more difficult for him to understand, that the Worms which he had inspected into, were *Gourd Worms*, because that they were not voided together with the Excrements, but taken by the Mother creeping on the Back and Belly of the Child; so that it might seem uncertain whether they came from the Anus or the Bladder. Indeed *Fernelius* speaking of the *Ascarides*, says, That he observ'd that those little Worms proceeding from the Anus, often creep on the Thighs and Buttocks, with a certain Itching. I myself have observed the same thing of *Gourd Worms*, in a Virgin of whom hereafter, and therefore am the more induced to think that the *Gourd Worms* were really the Worms, *Schrockius* mention'd.

AT the same Time about the Year 1683, *Dr. Tyson* undertook to describe the broad Worm, and esteem'd it the second Worm of *Platerus's*; which Opinion of the same Worm *Leuvenhock* ten Years after embrac'd, but us'd but few Words; and also at the End of the Century *Nicolaus Andry*: But how great Moment their Opinions are, and What new Discoveries they make is the thing that is to be seen.

BUT before we undertake this, let us take Notice of an Observation of *Wagnerus's*, of a tape Worm voided by stool without pain twelve Ells long, transcribed from the Journal of the *Baltick* 1699. It is not very long, says this very learn'd Author, since I mention'd long or round Worms in a human Body, like Earth

Earth-Worms, which perforate the Body without Pain. But now I produce another Observation on the Broad, or Girdle, or Tape Worms, which are call'd Gourd-Worms, when they are compos'd of many Parts, which when single are like the Gourd Seed. I was shew'd a very great Body of Worms joyn'd together, but distinguished by Foynts, with a rough and knotty Head, ending like a Shoe-Maker's Awl, six Ells long, but yet not whole, which was voided by Stool this Tear in May by a Soldier, without any Gripings or Uneasiness; but I add, that according to the Account of the Soldier, and Chirurgeon of the Regiment, that the remaining Part which was voided shortly after was much longer than the former. Thus he very elegantly affirms, that the broad Worms are compos'd of many Parts, which when single are like Gourd Seed, from whence they are call'd Gourd Worms. Also the same Author explaining to us the Nature of these single Parts, adds, that the broad Worms are a large Body of Worms joyn'd together, that is a Chain or Link of Worms; from his learn'd Commentator Holterfohtus, who very rightly infers, that here he asserts Nervously, that it was not one Worm, but many Worms, like Gourd Seed, joynted together. Therefore by these Words Wagnerus seems to depart from the Opinion of Placrus, and those other Anthors, who defend the Worm's unity, and apparently sides with our Arabians. But, allow this, What becomes of the rough and knotty Head, ending like a Shoe-Maker's Awl, of which there is Mention afterwards? Are not the Bodies of all those Worms, which constitute that Heap or Body of Worms, not only so joyn'd, but also so inseparably intermix'd, that from them all, there is one Body compos'd, and one Head given common to the whole Heap or Chain? This is not likely. But if we shall attribute such a Head to single Worms, or only to one single one, the

chief of the Parcel, we shall seem only to have said it, unless there was a Demonstration. All would be well, if we should take away that Head, (as what will be said hereafter will make it appear it ought to be taken away) whose Form and Description seems partly to be borrow'd from *Forestus*, and partly from *Amatus Lusitanus*. The Year before the most celebrated *Lentilius*, publish'd in his *Practical Miscellanies of Physick*, an Observation of the broad Worms, in which there are these Words; On March the 3d, 1693. *A Worm was brought to me, that had neither an Head nor a Tail, half an Inch broad, and eight Foot long; the Worm in my Opinion, was not a broad or Tape Worm, but a Gourd Worm, like that describ'd by Sennertus, very white, transparent, interwoven with white Fibrils, with Joints like the greater Horse-Tail; so that I am almost of Borrichius's Opinion, who thinks that the broad Worm ought not to be call'd so much a Worm, as Worms, esteeming every joynt a Gourd Worm.* But we may infer that this learn'd Author had both seen the *Gourd-Worms* single, and joyn'd together, and that he was of the Opinion of those Authors, who said that the Worm call'd the *broad Worm*, was compos'd of many Worms. But, by his leave, this kind of broad Worms, which is reckon'd among *Platerus's* second Species, is not very like the first Kind. Also *Borrichius*, and many other Authors are of the same Opinion accounting these two Kinds, which were, as 'twas likely, not distinguish'd, and all broad Worms for the *Gourd Worms*.

C H A P. V.

Here the Reader is desir'd to Consult Dr. Tyson's Dissertation of Worms, the Sequel whereof will shew, that he was sometimes Mistaken; and also you may meet with something which may be serviceable towards the thorough Understanding the Nature, not only of the Gourd Worms, but also the other broad Worms, as we shall shew hereafter more plainly. Also there are many Places in Authors here quoted by Tyson, to which I shall give hereafter, either another, or a fuller Explanation; and to do this more easy, I thought it proper to transcribe the same Places again, as well for the Benefit of the Reader's easy finding out the proper Words of the Authors, as also because the whole Paragraphs were not always incerted by the said Author.

I Envenbock, speaks thus of the broad Worm. A certain Physician lately shew'd me some small Parts, consisting partly of one Foynt, and partly of more, which he thought were pieces of Worms, and desir'd me to examine them. I inspected them with a Microscope, and judg'd them not to be Worms, but Parts of Worms, and so much the more, because I could not distinguish an Head, or a Tail among them; and when I separated those Parts which were broad, there came out of the broken Parts, a great and almost incredible Quantity of small Clots. These Clots were a little larger than those which render our Blood red, and they were as equal in their Proportion

as Shot. The Man that voided these small pieces of the Worm was sickly and under the Care of this Physician, and voided afterwards a piece of Worm much larger; from whence this Physician then became more certain, that these were pieces of that Worm which they call the broad Worm, a Draught of which is to be seen among others in the Philosophical Transactions.

THUS far Leuvenhock of the Worm inspected by him, which Worm he thought, if he had examined it more nicely, was not one Worm, but that it consisted of many Worms join'd together. Moreover, we shall take Notice hereafter of many things belonging to the Clots observ'd by him; but, for the affinity of the Matter, we must not here omit some things which the same Author delivers to us, in the following Words, concerning the like Worms being found in the Guts of some certain Fishes.

Afterwards considering those Worms, which are compos'd of divers Joints, and which I had discover'd in the Guts of Eels; I again took the Guts of 4 Eels, and opening them, I saw in them Worms longer than I ever saw before, I endeavour'd to draw these Worms from the Guts, but it was in vain, because the Head of the Worm was fix'd so fast in the Gut that I could not pull it away, unless I broke the Body, which was presently extended very small, in respect of its former thickness.

This Worm was of an incredible Length, in respect of its Breadth; and though I divided it into several Parts, yet it remain'd in so great a Motion, by contracting the Body, that it was a diverting Object; for in one Part of the Body it squeez'd out little Knots; from whence single ones came forth very short and broad, and other Knots at the same time were extended very long and slender, and this happen'd in the Worm in a great many Places at once, for by this Motion of Extension and Contraction the Worm crept. When
the

The History of Worms.

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The Worm contracted itself very much in any one Place, was there six times broader, then when it extended itself.

I saw by a Microscope in this Worm when broke, an incredible Number of little Clots, flowing out of its Body; these were of the same Size as those which I said flow'd from the broad Worm voided by a Man. And, as I may say, if you compare the Parts of the Worm, call'd the broad Worm, with those which I drew from the little Eels, which I think may be call'd Worms, there is only this Difference, that some are larger than others.

After this I inquired afresh into the Entrails of both Kinds of Eels, to see whether I could discover any other Kind of Worms, and I was the more induc'd into it, because I happen'd some Tears ago to find some little Worms in their Guts, like those which Children void, sometimes with the Excrements. While I was busy with these, I discover'd four Kinds of Worms, but none that were worth my Observation.

I often had, when I was speaking of Generation, this Objection made me, from whence do Worms arise in the Bodies of Men and Beasts, in which I have not hitherto been satisfy'd, but seeing that Eels had in them Worms that were like those which Men void, I resolv'd to observe the inward Parts of a certain Sea-Fish.

Therefore having got a Turbot, I saw lying in its Guts several Worms of many Joints, and which were like the Worms, call'd the broad Worm, which I said I found in the Guts of Eels; but they were by no means so long as the Worms in Eels, and moreover the Head was form'd after another manner; for as the Head of those Worms, which I took out of the Guts of the Eels, was made up of Parts, like Hooks; the Heads of these were only open in the upper Part, but also were very long, and as if they were cleft on the lower Part.

But

But in these Worms, which were taken out of the Guts of the Turbot, it seems strange to me that they should be fix'd so fast by the Head into the Gut; for I could not pull them out of the Gut, but the hinder Part of the Body, which was before very much extended, would be every where broken, in so much that I could not pull the Worm away whole, unless I extended the Worm out very long with one Hand, and divided the Gut, in which the Head was fix'd with a fine Needle with the other Hand, and thus I freed their Heads from the Gut, and so put those Worms into small Glasses, which I had prepared for that Purpose, and by this Means, I saw them very distinctly. Now we may imagine with ourselves, that these Worms breed in the Guts, like other living Creatures; so that I have often seen Worms, which I have taken out of the Guts of Eels, big with their Fœtus like themselves, and when these Worms do bring forth their Fœtus, we must imagine that a few small Worms of this Kind, and those lately bred, may remain within the Guts of the Fishes, because being not yet fix'd in the Guts they are mix'd with the Chyle, and so many are voided, for if it was otherwise, these Worms would increase to a great Number.

Moreover, we may assert, that many Worms of this Kind, which for their smallness are invisible, swim in Water, we shall shew that they are easily convey'd into the Intestines of Infants, because we know that many People drink Water, and though they don't drink it; yet when they wash a Cup, or Glass, there are always some Drops that adhere to them, in which there may be very small Worms; besides 'tis common in Summer-time to give little Children raw Milk, which Country People are often apt to mix with Water. Now if this be allow'd, we need not wonder how Worms get into the Intestines of Men, Beasts and Fishes. After this, I took and open'd the Stomachs of several Turbots,

in which I saw a great many Worms call'd broad Worms, so folded together, that I took a great deal of Pains before I could get one whole; indeed there was such a Number of them, that those which were in one Stomach when put together, were as big as a Ball of an Inch in Diameter; and yet, what I am most amaz'd at, is that this Turbot was as well fed, as if it had had no Worms in his Stomach. Not far from our Town, there is a Water very full of Fish, in which they take a great many Breams, which they call Riembrassems; these Breams had this Name given them, because there is found within their Guts, a very long Worm like a Girdle.

I myself indeed, many Tears ago took these Worms out of the Breams; but not observing them then, I flung them away out of a Distaste to this Kind of Fish.

The Breams, which have these Worms, are commonly very slender, insomuch that a Fisherman that Fishes in those Waters, told me, he could almost see by the outward Appearance of them, whether they had a Girdle-Worm (for so they call'd these Worms) within them.

But, when I was upon the Observation of these broad Worms, I bid a Fish Woman whenever she gutted a Bream, or a Trout, that had this Worm, to bring those Fishes to my House.

A few Days afterwards, this Woman brought me a Trout, which had this kind of Worm, and examining it, found it made like the broad Worm, which I spoke of, only there was this Difference, that this Worm was thicker than any of the others.

But once again, I search'd diligently in the Guts of both Kinds of Eels, and in them I found among other things, the above mention'd little Worms, which when set before the Microscope, seem'd to be form'd after the same manner as those, with which Children are very much tormented.

Now

Now observing that these, and all those other Worms, which I discover'd in the Guts and Stomachs of Fishes, are fix'd very close to the Guts (for otherwise they would easily be voided with the Chyle) I thought that those Worms did not feed on the Chyle in the Stomach and Guts, but on the very Vessels of the Stomach and Guts; and so any Medicine, which is commonly Worm Seed, that is given to Children to kill and expel the Worms, might have but little Effect, because the Worms have their Heads fix'd close in the very Substance itself; neither is it to be believ'd that that Medicine should have so much force on the Skin of the Worm, as to kill or drive it away; but when the Worms change their Situation, which 'tis thought they do with their Heads, and meet with that Medicine, they may by this Means be kill'd, or expell'd.

If we may assert, what I have often Experienc'd, that the Worms have their Heads and Moutbs fix'd in the Guts, and, as 'tis very likely, receive their Sustainance from the many Vessels of the Guts, 'tis no wonder that Children are tormented with Worms, and complain of Pains in their Bellies; and they are in my Opinion, thus tormented, when the Worms change their Situation, and fix their Mouths and Heads afresh into the Gut; and perforate all the Vessels, and soft Particles, the inward part of the Guts consists of, which Matter was by many accounted only the Mucus of the Guts, when 'tis certainly the Vessels, which I am sure do transfer the most Nourishment from the Chyle to the Body, but I have handled this Subject more at large, in one of my Epistles to your Nobility, on the formation of the Guts; if we add, that these Worms do not receive Food, Nourishment, Growth and Preservation from the Chyle, but from the Substance in the Veins; it is most certain, that Children are not only afflicted with the Pain, as I have said before, but are deprived by these Worms of the greatest and best Part of their Nourishment, and so of Necessity become Pale and Sickly.

I purposed to have made an End with these Worms, but because I set my Eyes on some Haddocks alive, I took the Entrails of those Fishes, and found in the Stomach several Shells, and other little small Fishes, together with many small Particles, insomuch that I could not conceive how the Haddock came by them, unless he took them in at his Mouth, when he would have taken larger Animals, which live at the bottom. Also I found the same Matter in the Guts, and besides two little white living Worms, which were not fix'd to the Gut, but intermix'd with the Chyle. These two Worms were about the length of a middle fix'd Needle, and in Breadth every way proportionable, unless that they were a little smaller at the Tail, insomuch that they were almost Shaped like those Worms, with which Children are troubled. When I had almost come to the End of the Gut, I discover'd a third Worm, but dead, and just putrify'd; from whence I concluded that these Worms were not to be allured from the Guts, but to Meat; and I found the Skin to be very Tough, so that it was not to be broken easily. Moreover, I search'd into the Viscera of the Cod-Fish, and discover'd little Worms, both in the Stomach and Guts, which were much of the Size of those that I found in the Haddock; and among other things I happen'd to meet with a Gut full of Chyle, in which there were more Worms than I had ever seen before either in the Guts of the Cod, or the Haddock.

Some of these were larger than others, besides, I saw a kind of Worm, a little bigger, whose Skin was pleasant to the Sight, because it appear'd, as if we saw a Worm like a small Eel, whose Skin seem'd to consist of very white Pearls very equal; but 'twas very thin at the Tail, where they were something smaller; but of all these Worms, I found none that were fix'd by the Heads to the Guts.

THUS

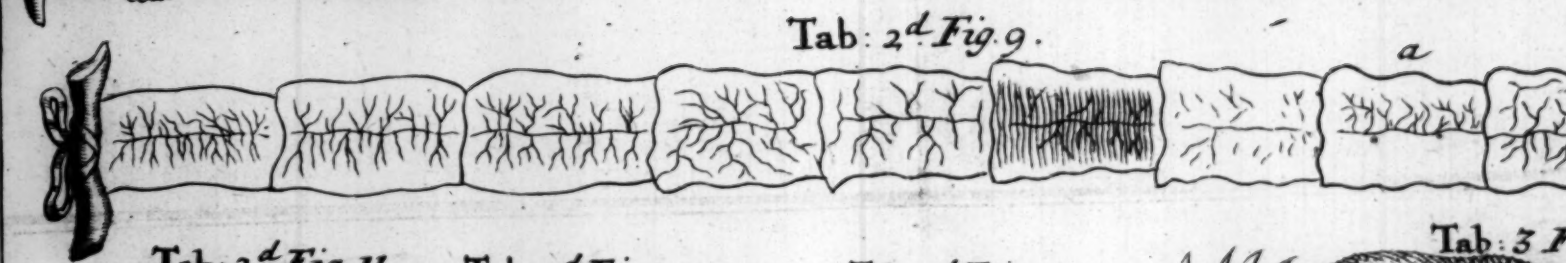
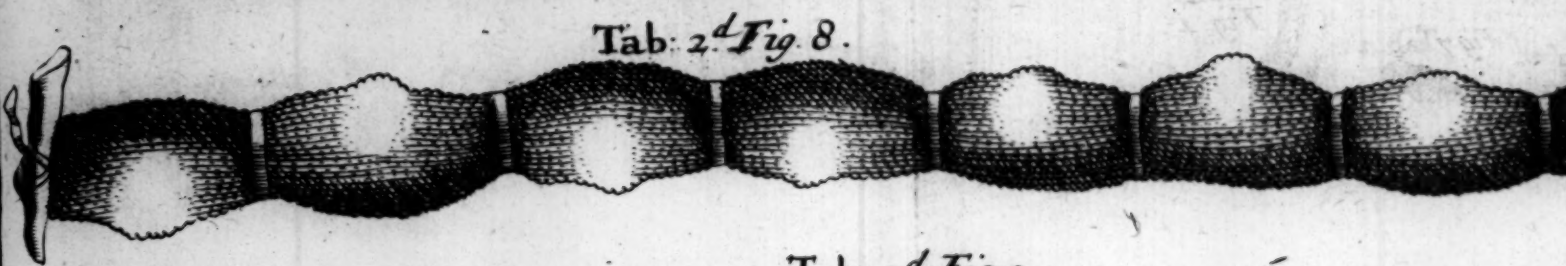
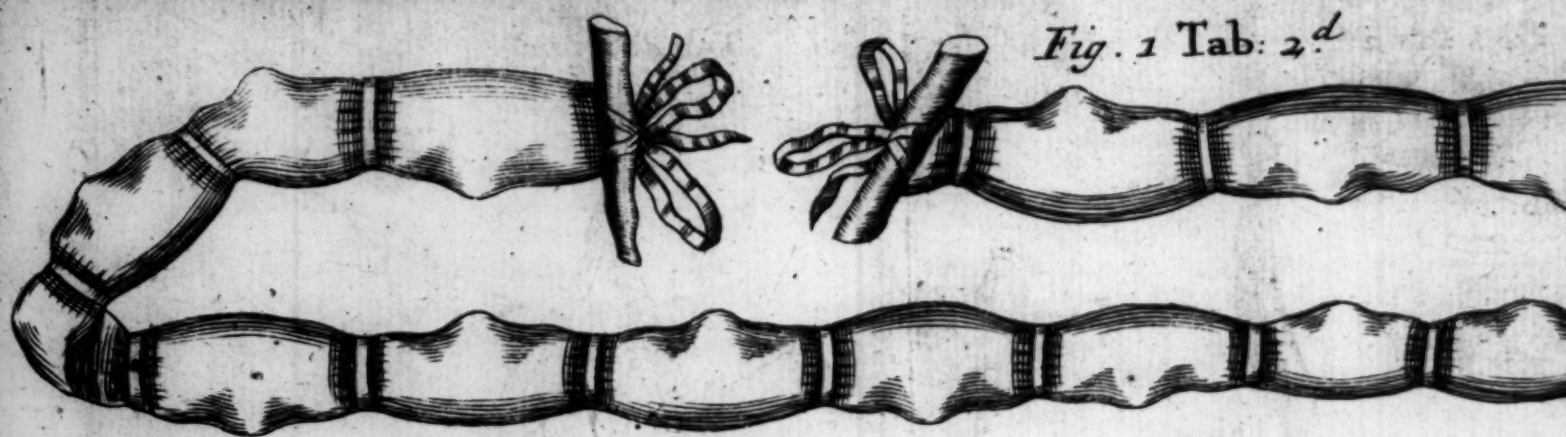
THUS far *Leuwenhoek*. For the rest I must desire my Reader to Consult *Andry*, on the *Generation of Worms*. Chap. 3. It being already translated into *English*, wherein he will find the Figure of *Tania* explain'd, as we have done. Tab. and 2d.



C H A P. VI.

Contains an accurate Description of Gourd Worms, and the second Tape Worm of Platerus, or the degenerate base Tape Worm of Spigelius, and of the Tube, in which the Gourd Worms, are sometimes involv'd, Vallisnerius; in which the Opinion of Andry, Tyson, and others who accounted the Tape Worm, one single Worm, is refuted, and all Controversies on this Subject removed.

WE have hitherto spent a great deal of Time, and many Witnesses have been produced by whom we would willingly find out the Truth; but the disagreeing of those Witnesses among themselves, seems to prove, that it does not apparently shine forth. We have carefully enquired, whether the other Kind of tape Worm of Platerus's is one Worm, or is composed of many Worms (call'd Gourd Worms link'd together.) The greatest Difficulty to distinguish the broad Worms, lies in the answer to this Question, and



Tab: 2^d Fig. 11.



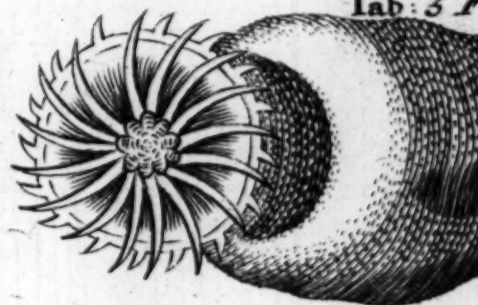
Tab: 2^d Fig. 12.



Tab: 2^d Fig. 13.



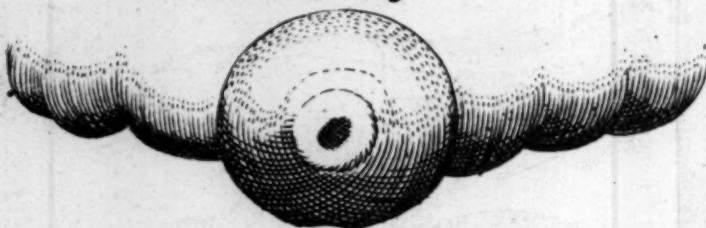
Tab: 3^d



Tab: 3^d Fig. 4.



Table 3^d Fig. 3.



Tab: 3^d Fig. 5.



Tab: 3^d Fig. 6.



Tab: 3^d Fig. 8.



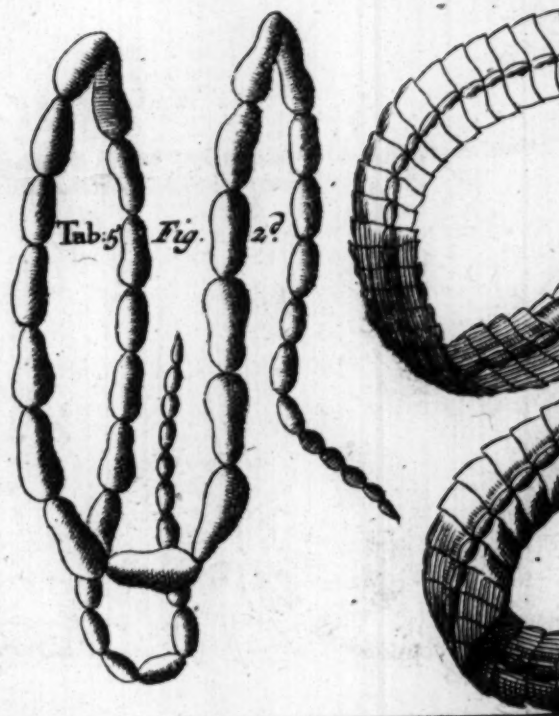
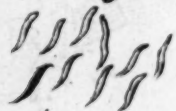
Tab: 3^d Fig. 7.



Tab: 3^d Fig. 9.



Tab: 3^d Fig. 10.



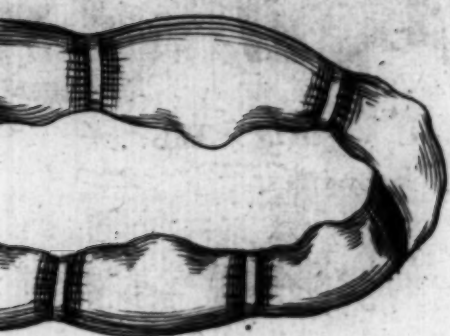


Fig 2 Tab: 2^d



Fig 3 Tab: 2^d



Fig 4 Tab: 2^d

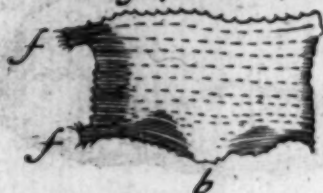


Fig 5 Tab: 2^d

Fig 6 Tab: 2^d

Fig 7 Tab: 2^d

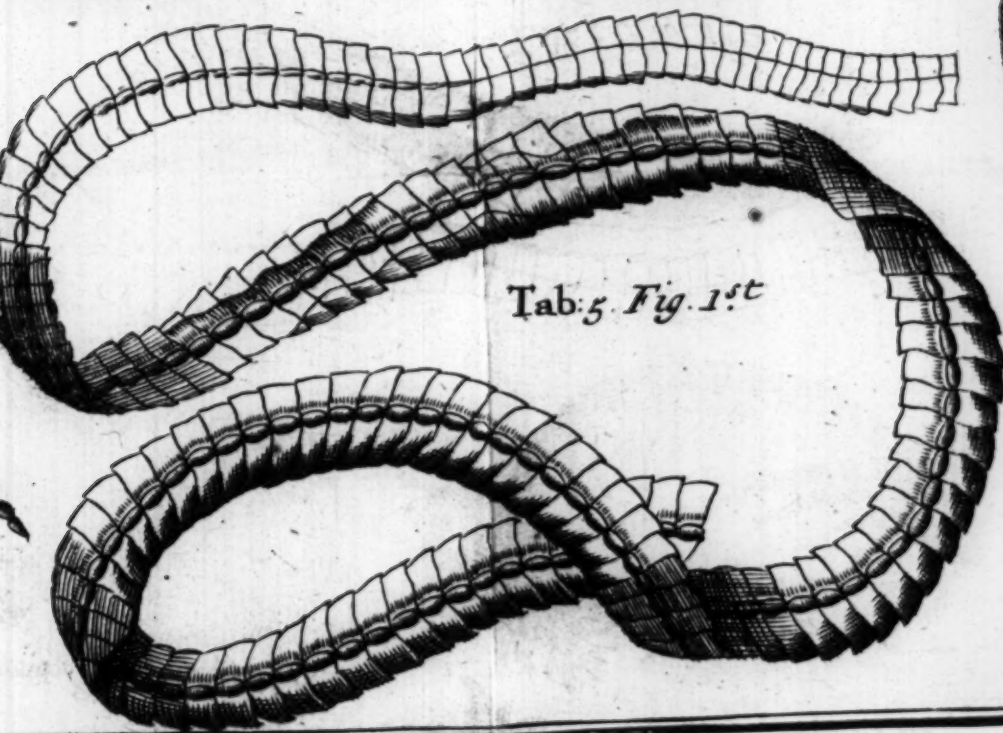


Fig 10 Tab: 2^d

Tab: 3 Fig. 1.



Tab: 3. Fig. 2^d



Tab: 5. Fig. 1st



Tab: 4 Fig 1.

Tab: 4 Fig 4.



Tab: 5 Fig 3.



b: 2^d

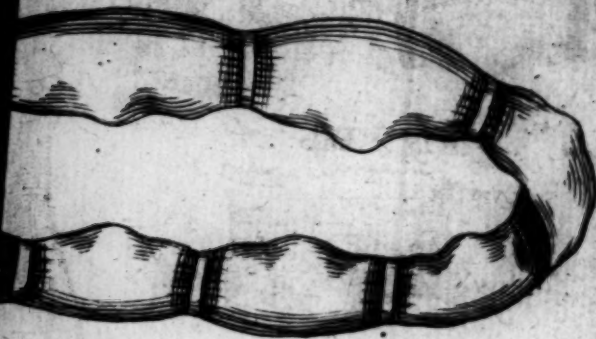


Fig 2 Tab: 2^d



Fig 3 Tab: 2^d



Fig 4 Tab: 2^d

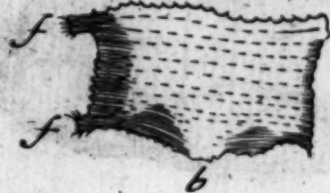


Fig 5 Tab: 2^d



Fig 6 Tab: 2^d



Fig 7 Tab: 2^d



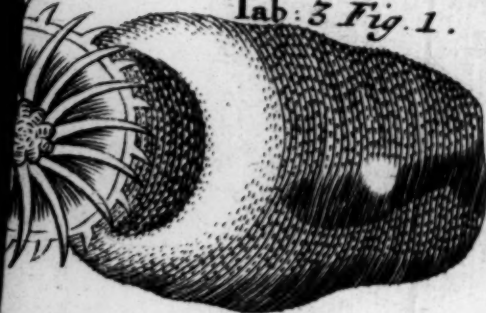
Tab: 4
Fig 1



Fig 10 Tab: 2^d



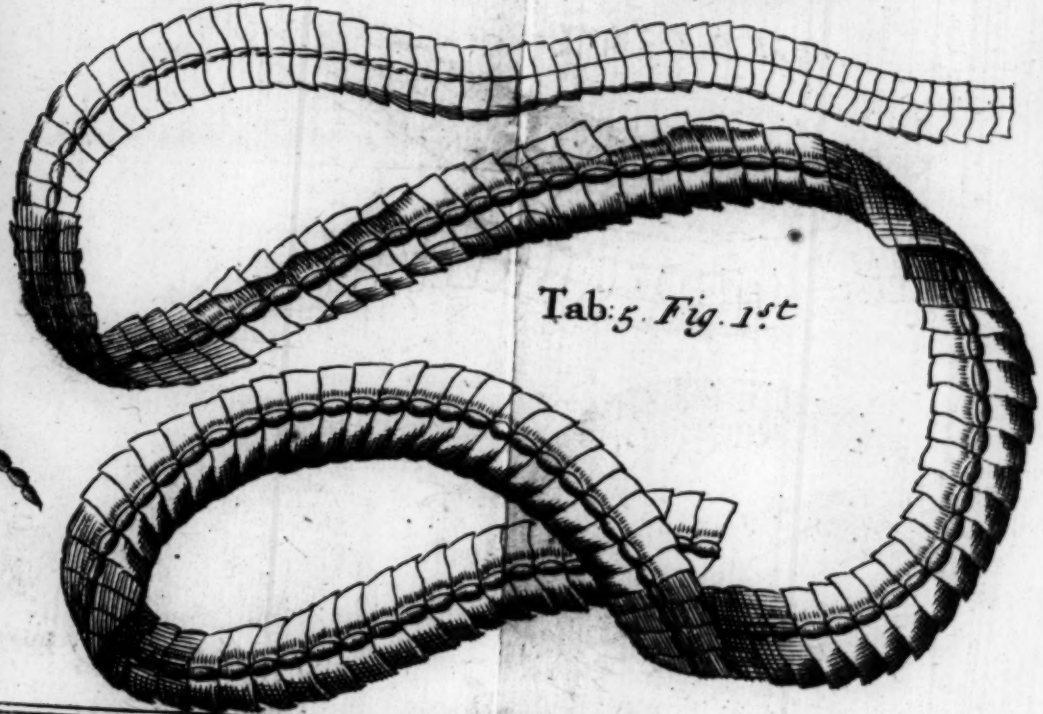
Tab: 3 Fig. 1.

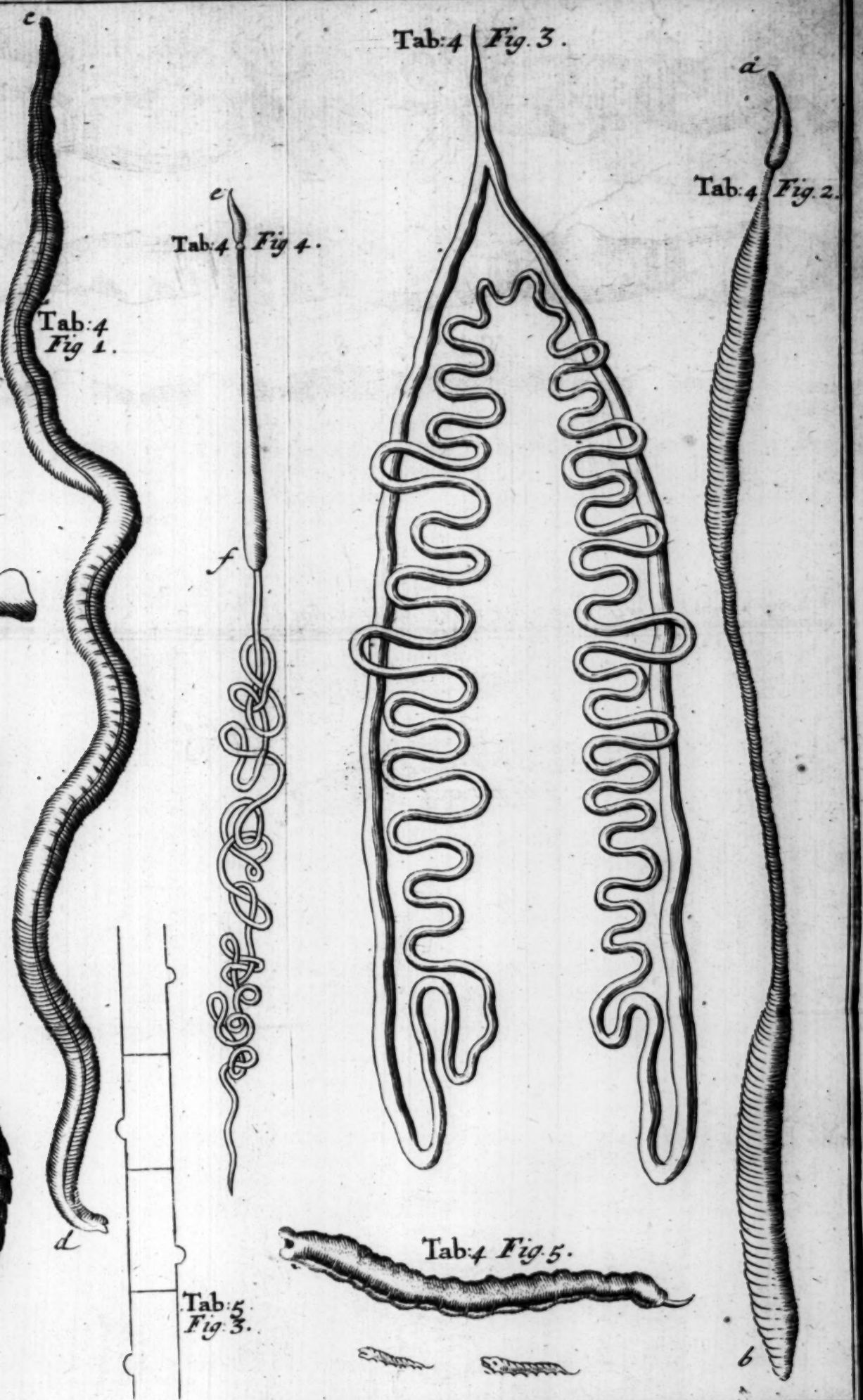


Tab: 3. Fig. 2^d



Tab: 5. Fig. 1st

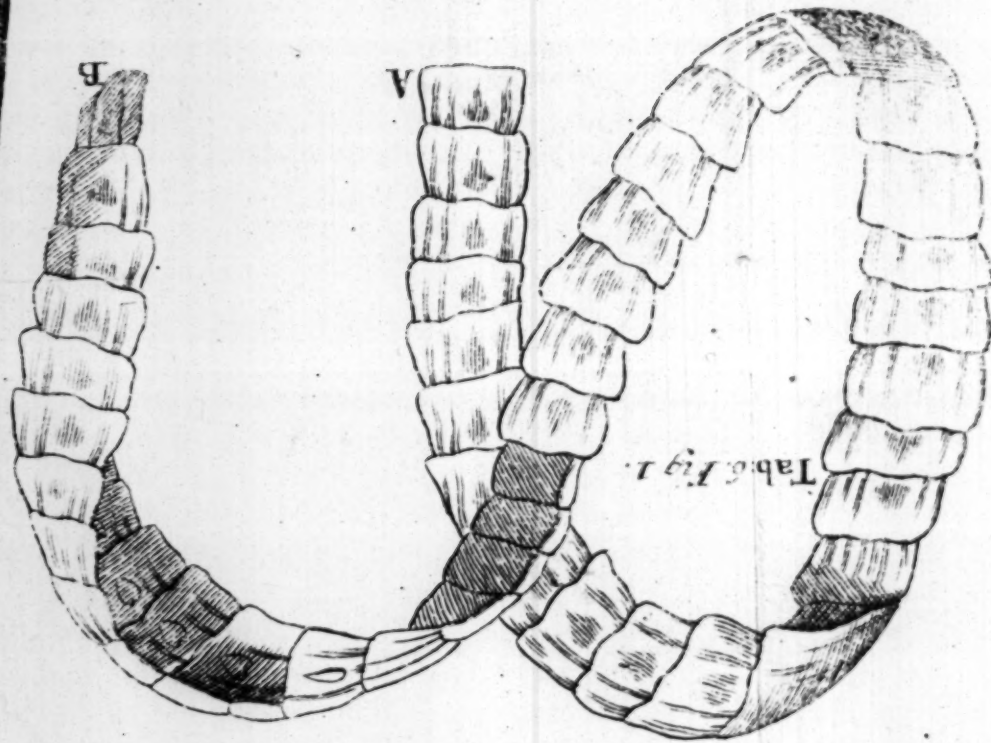




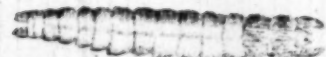
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Tab. 7. Fig. 2.



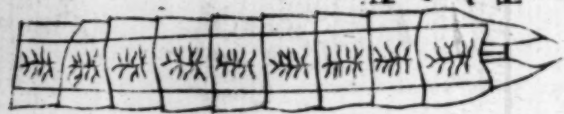
Tab. 6. Fig. 1.



Tab. 8. Fig. 7.



Tab. 8. Fig. 4.



Tab. 8. Fig. 5.



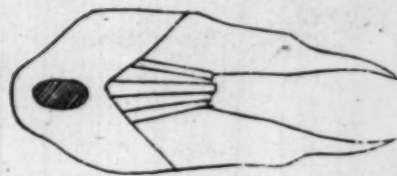
Tab. 8. Fig. 2.



Tab. 10. Fig. 3.



Tab. 10. Fig. 4.



Tab: 8 Fig 6.

Tab: 10 Fig 2.

Tab: 10 Fig 1.

Tab: 7 Fig 1st

Tab: 7 Fig 2

Fig 3.

Tab: 6 Fig 1st

Tab: 7 Fig 3.

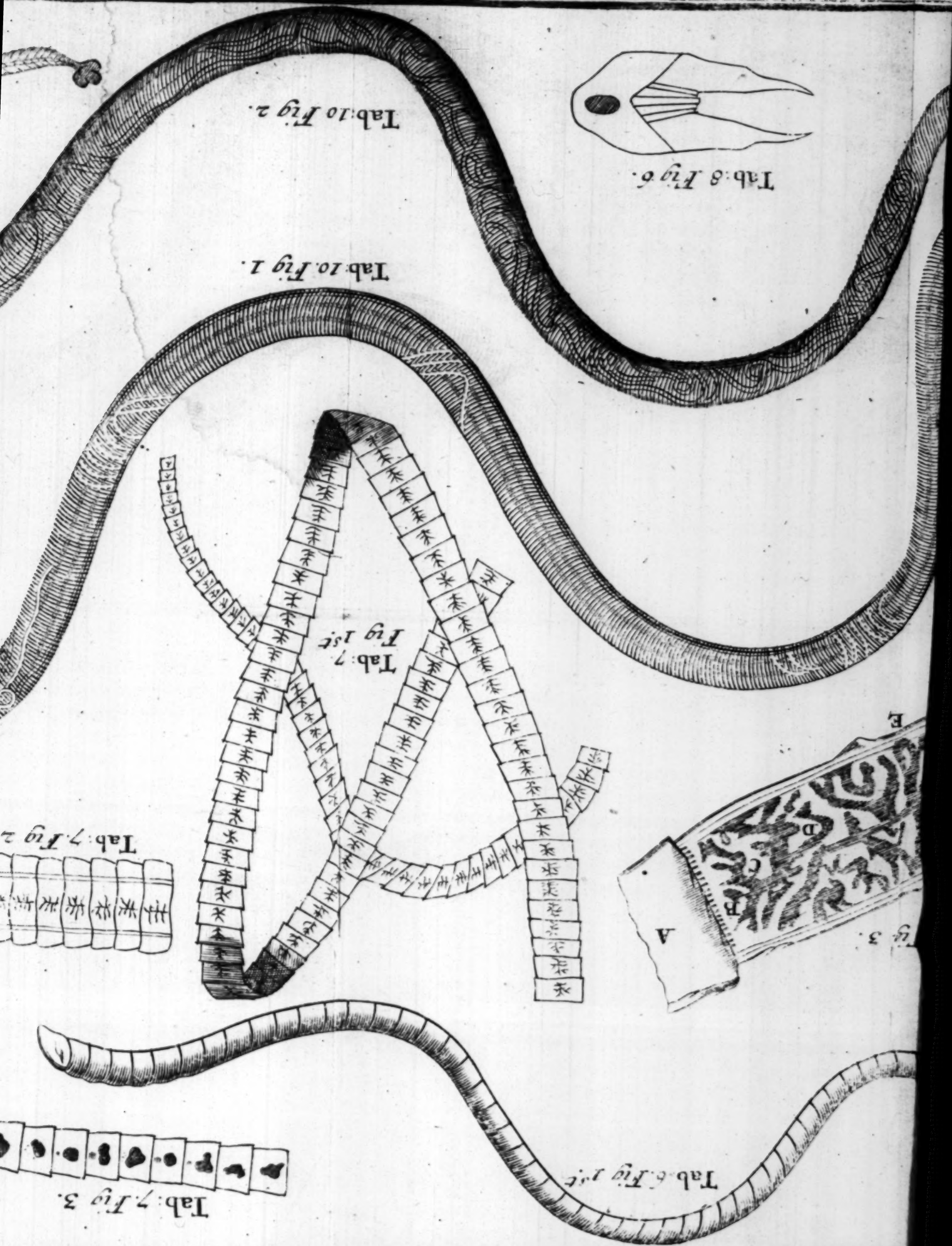




Fig. 6.

Tab. 10. Fig. 2.

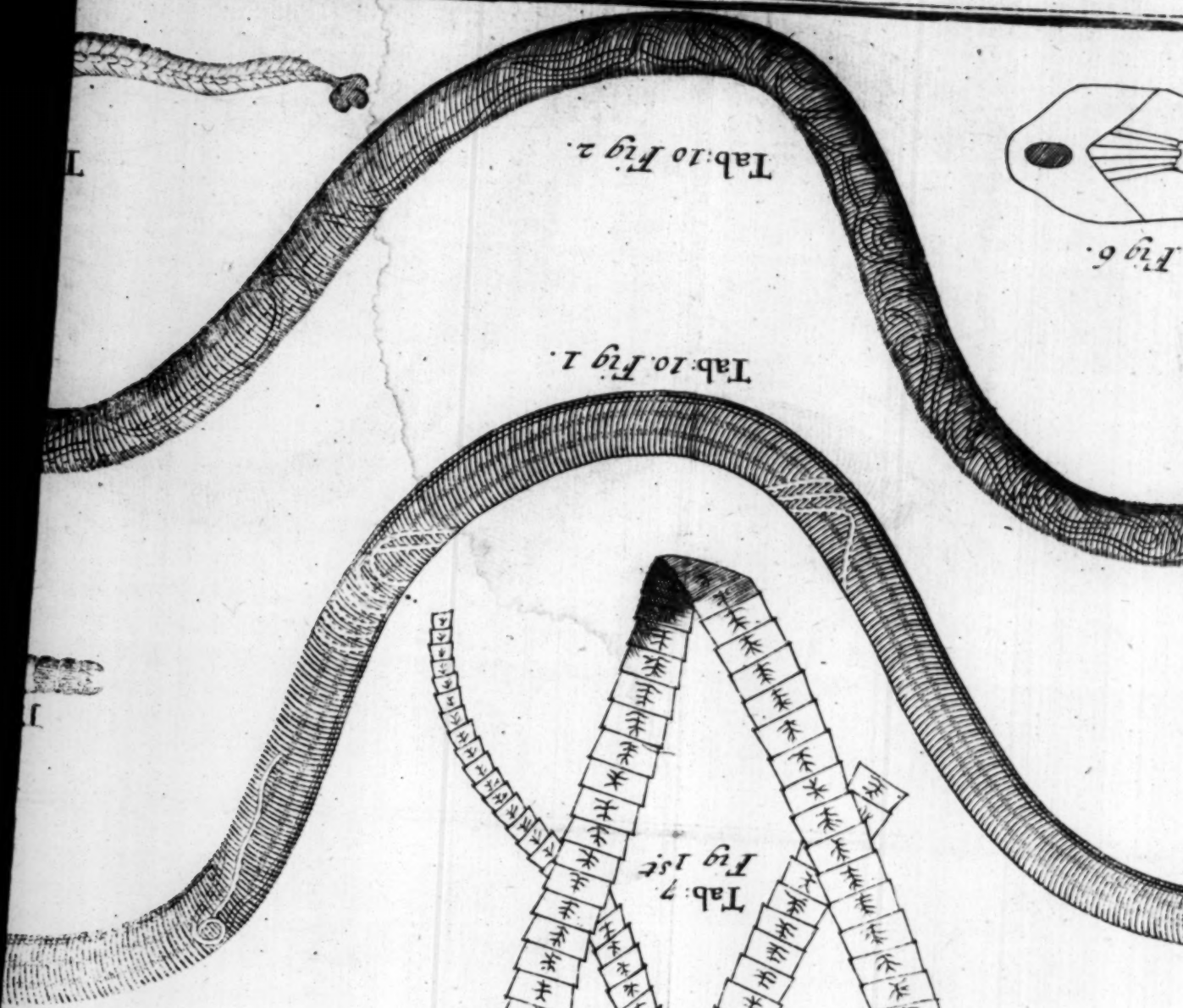
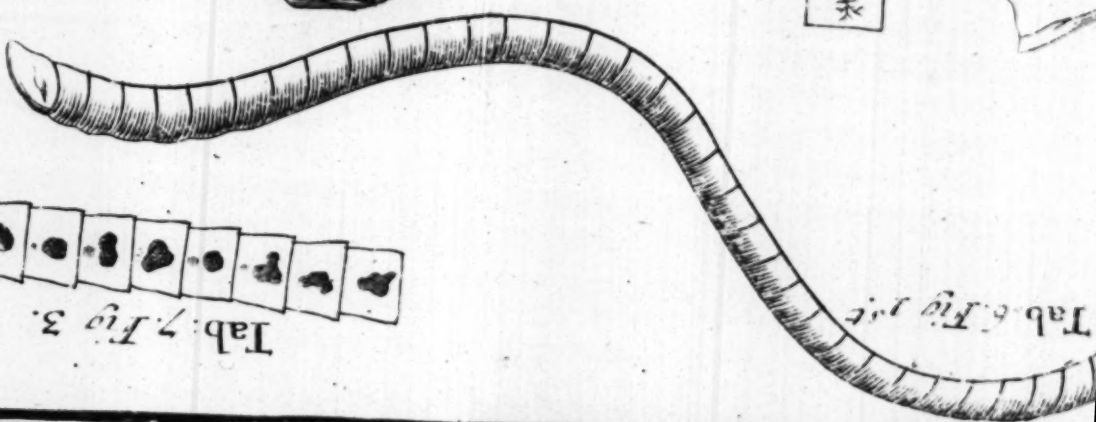
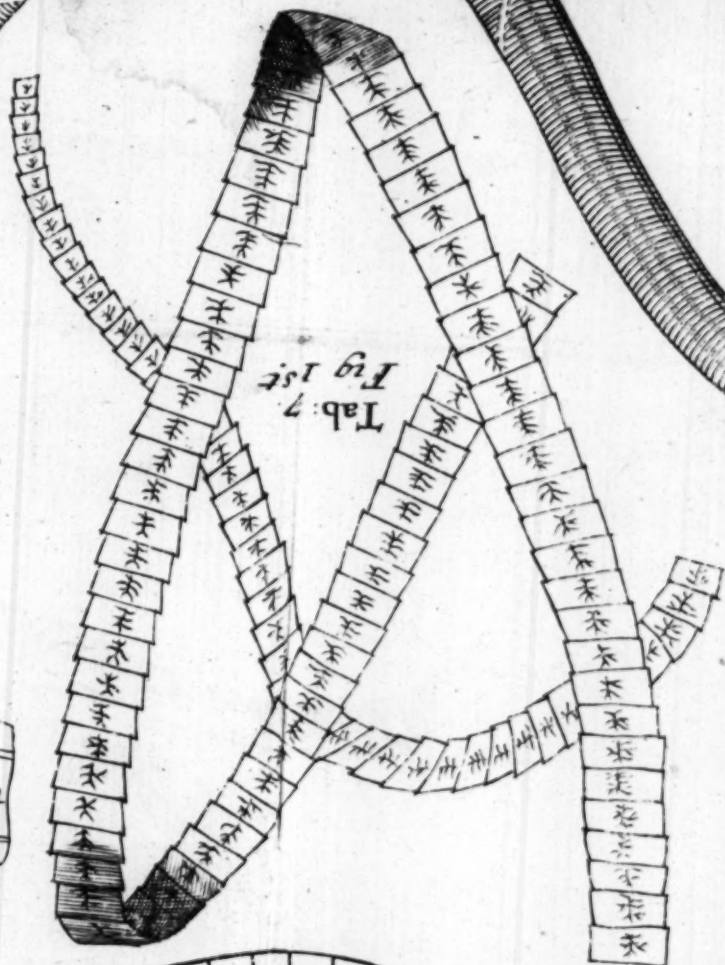
Tab. 10. Fig. 1.

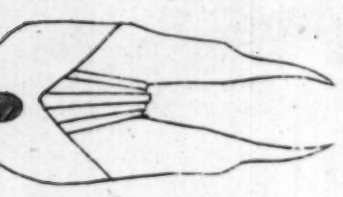
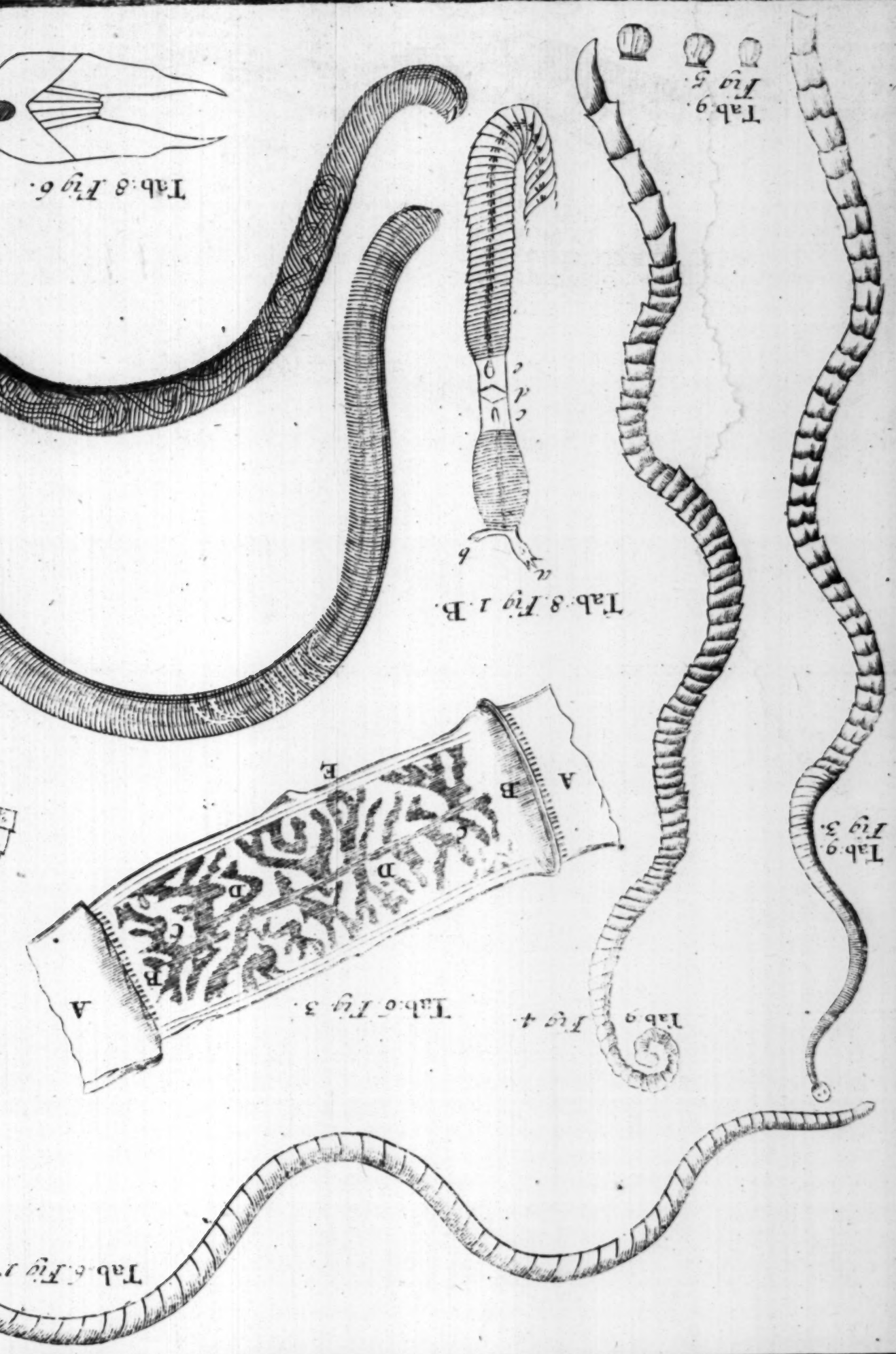
Tab. 7.
Fig. 1st

Tab. 7. Fig. 2.

Tab. 7. Fig. 3.

Tab. 6. Fig. 1st





Tab. 8 Fig. 6.

Tab. 8 Fig. 1. B.

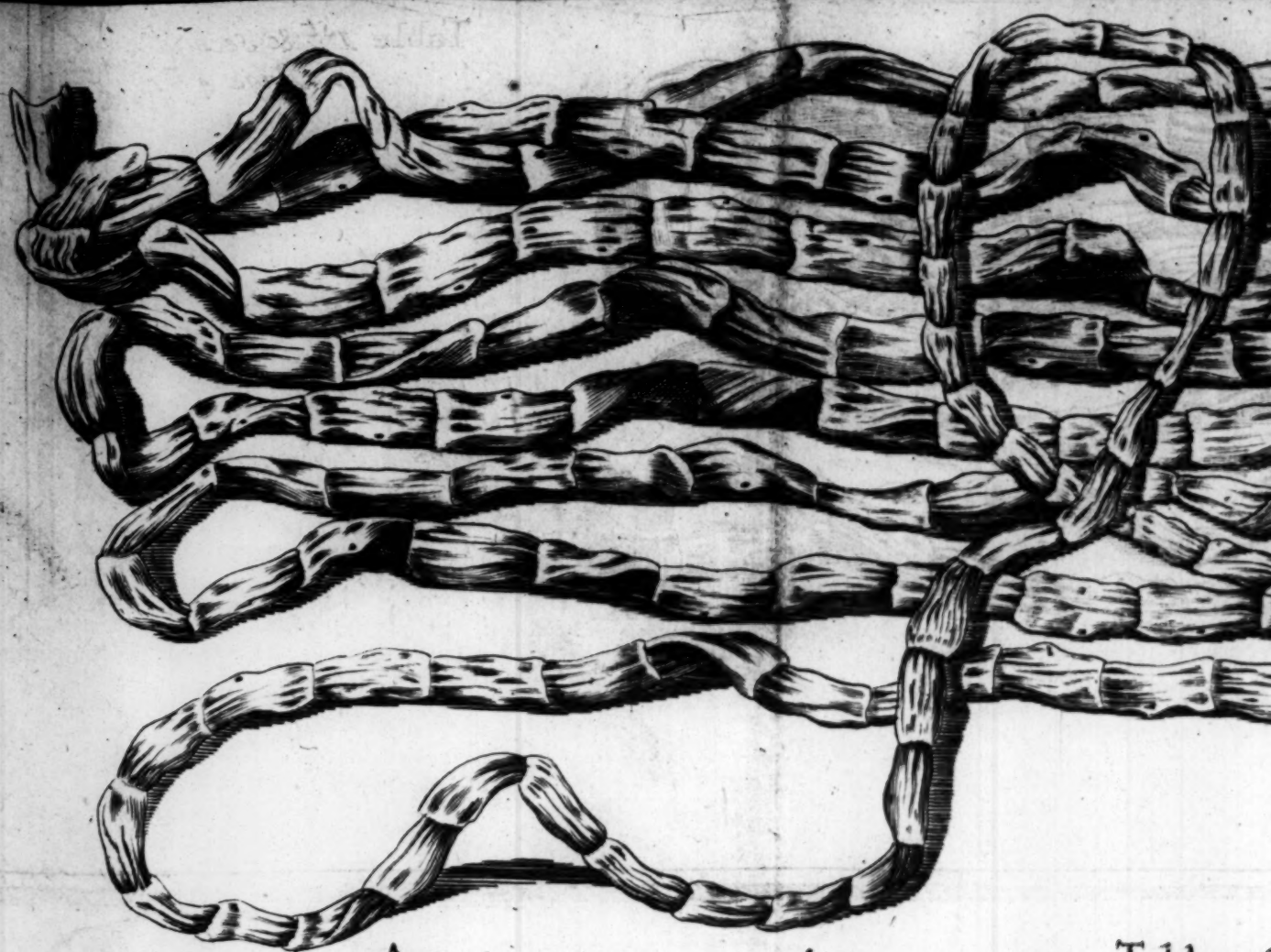
Tab. 9 Fig. 5.

Tab. 9 Fig. 3.

Tab. 9 Fig. 4.

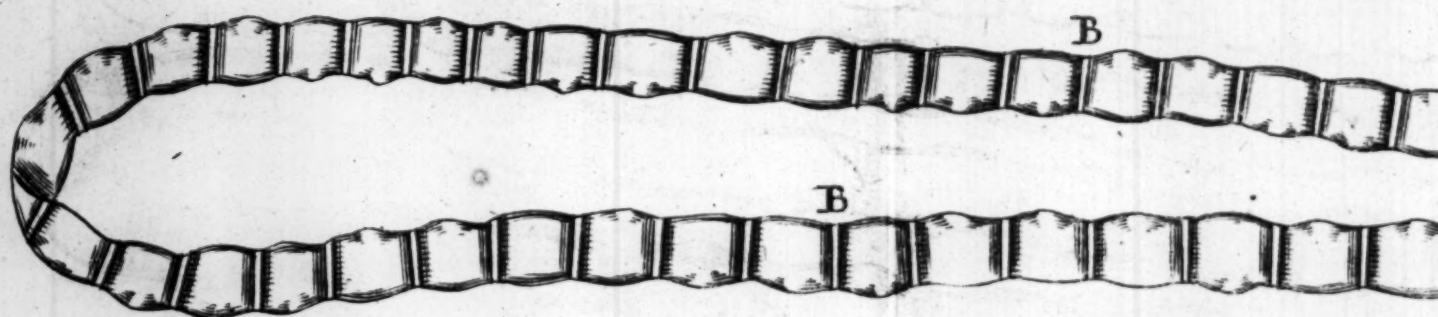
Tab. 6 Fig. 3.

Tab. 6 Fig. 1.



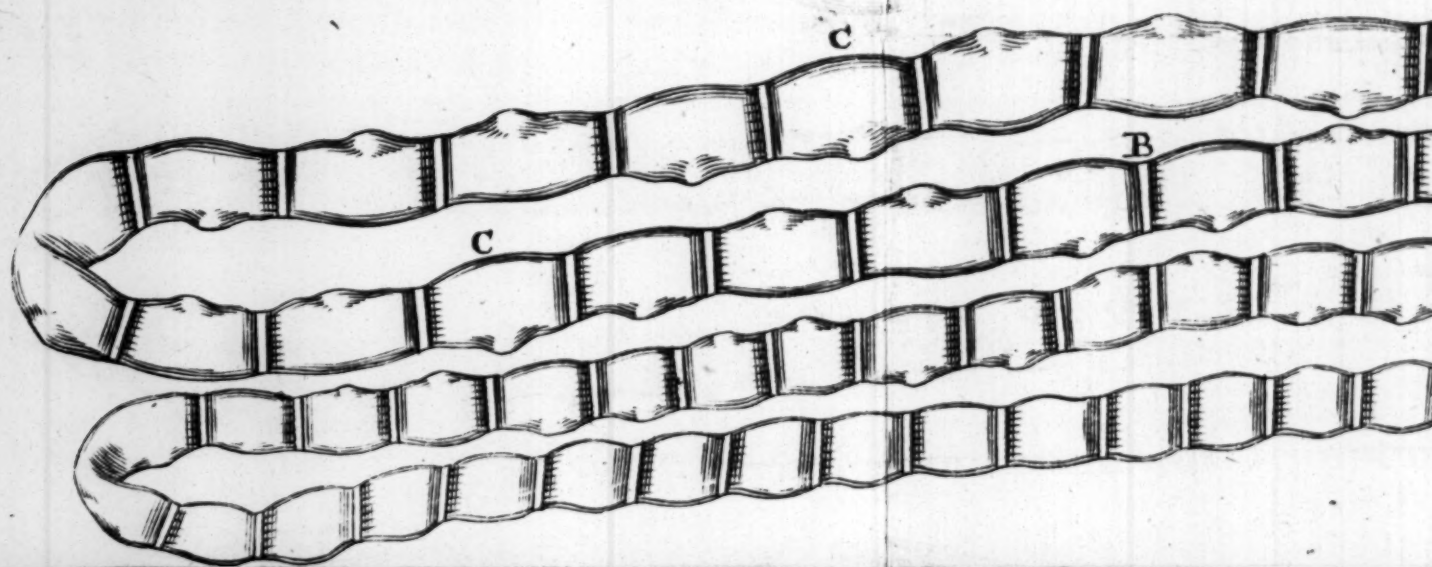
A

Table 29



B

B



C

C

B

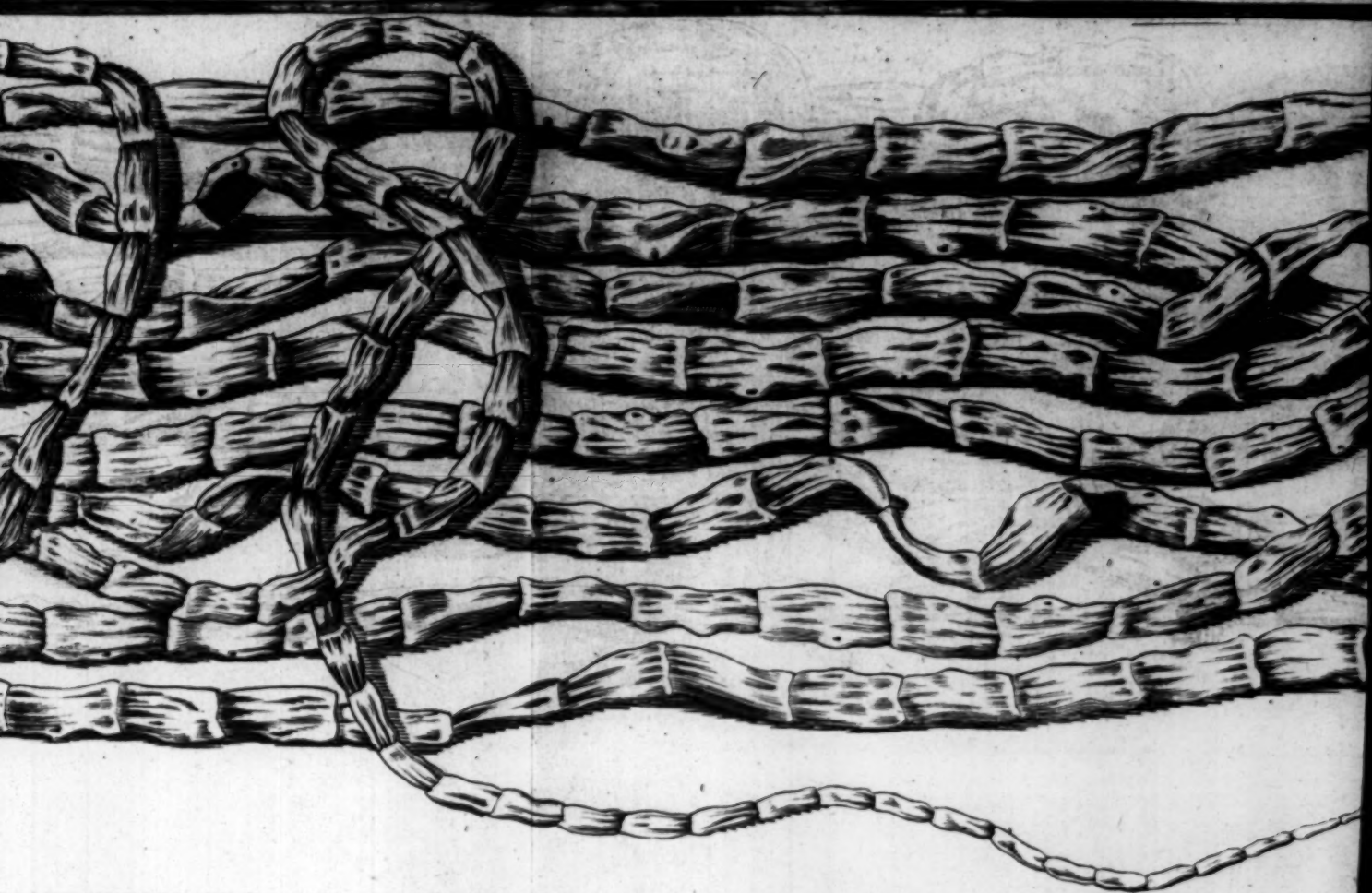
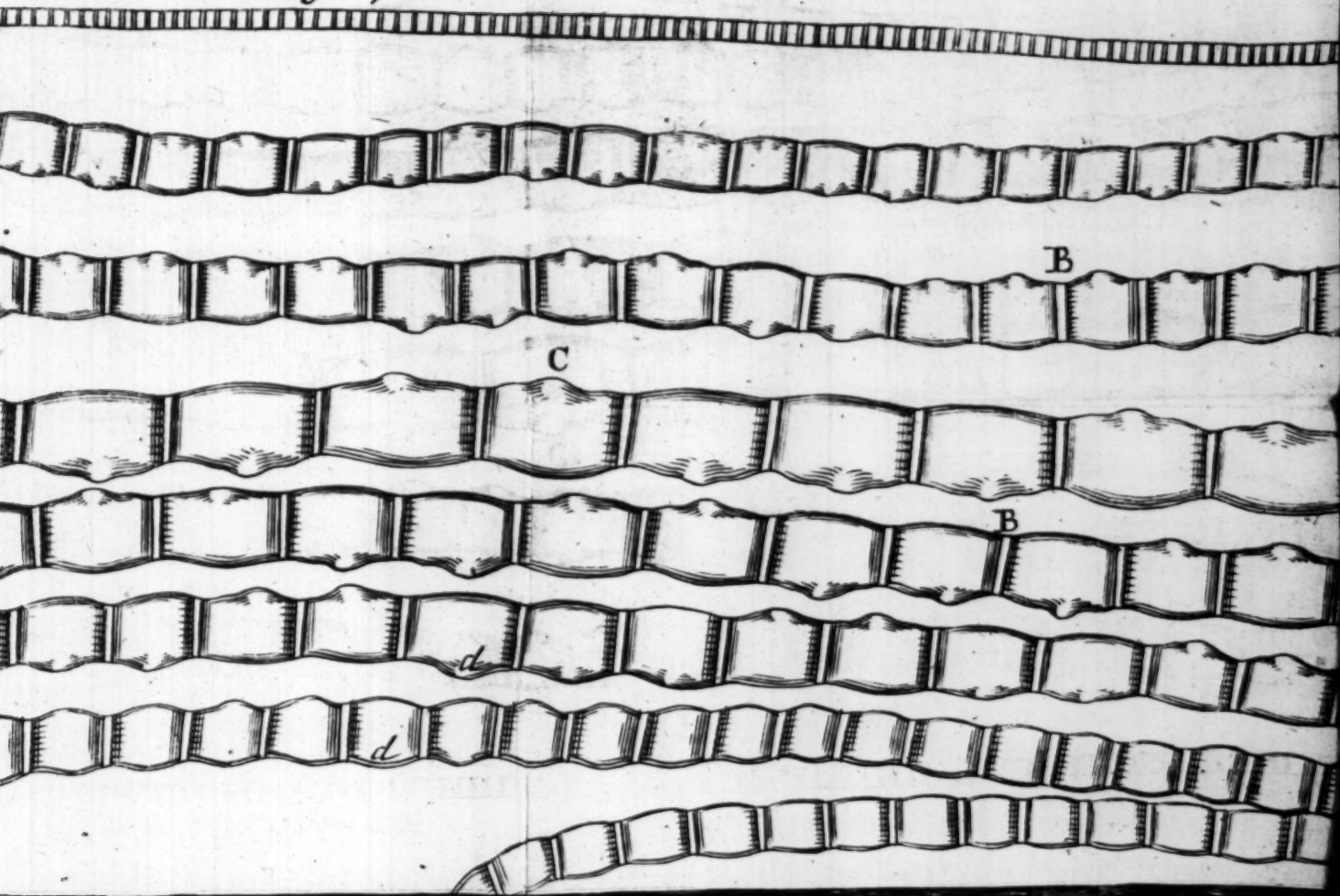


Table 1st B Page 70.



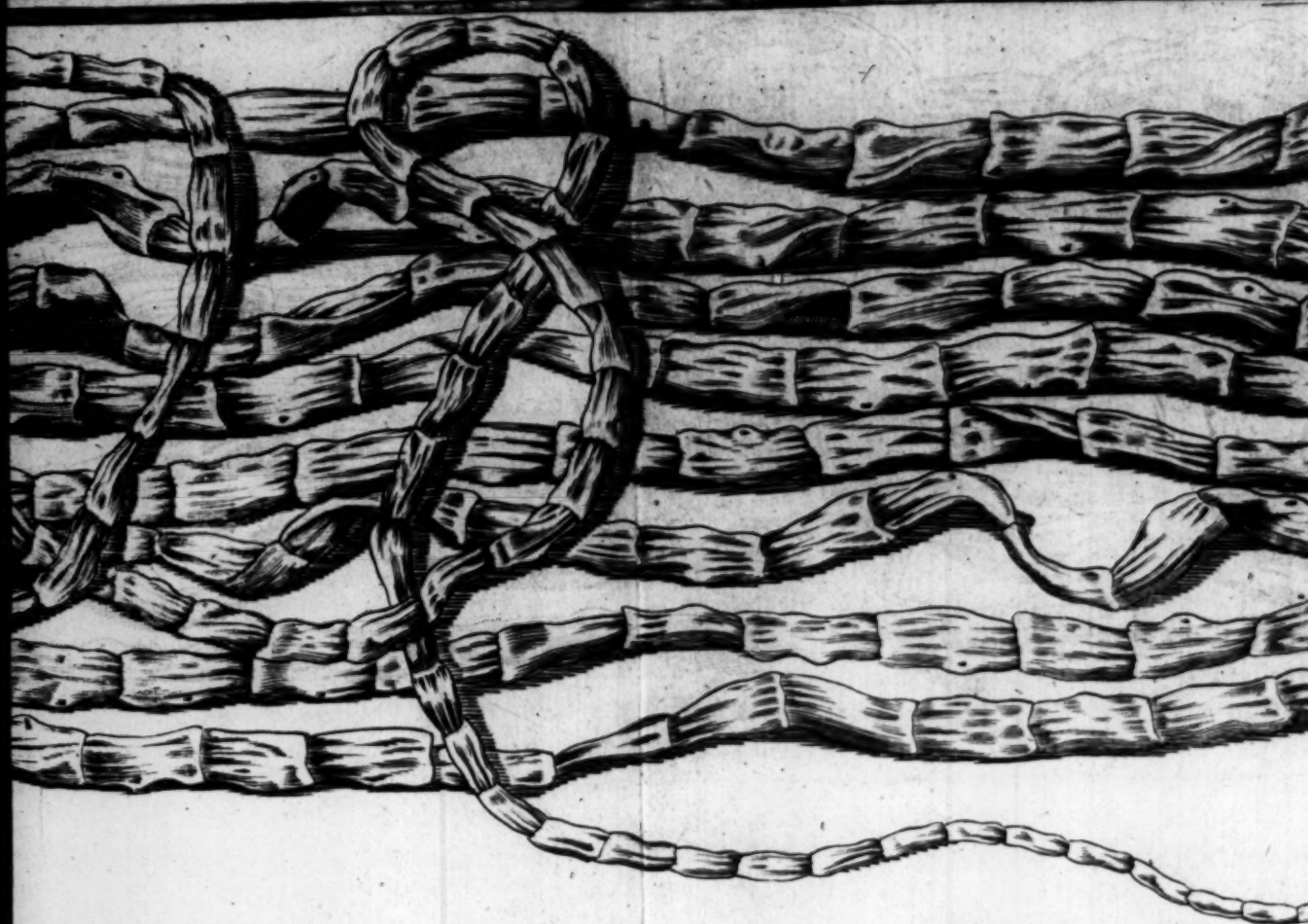


Table 2st B Page 70.

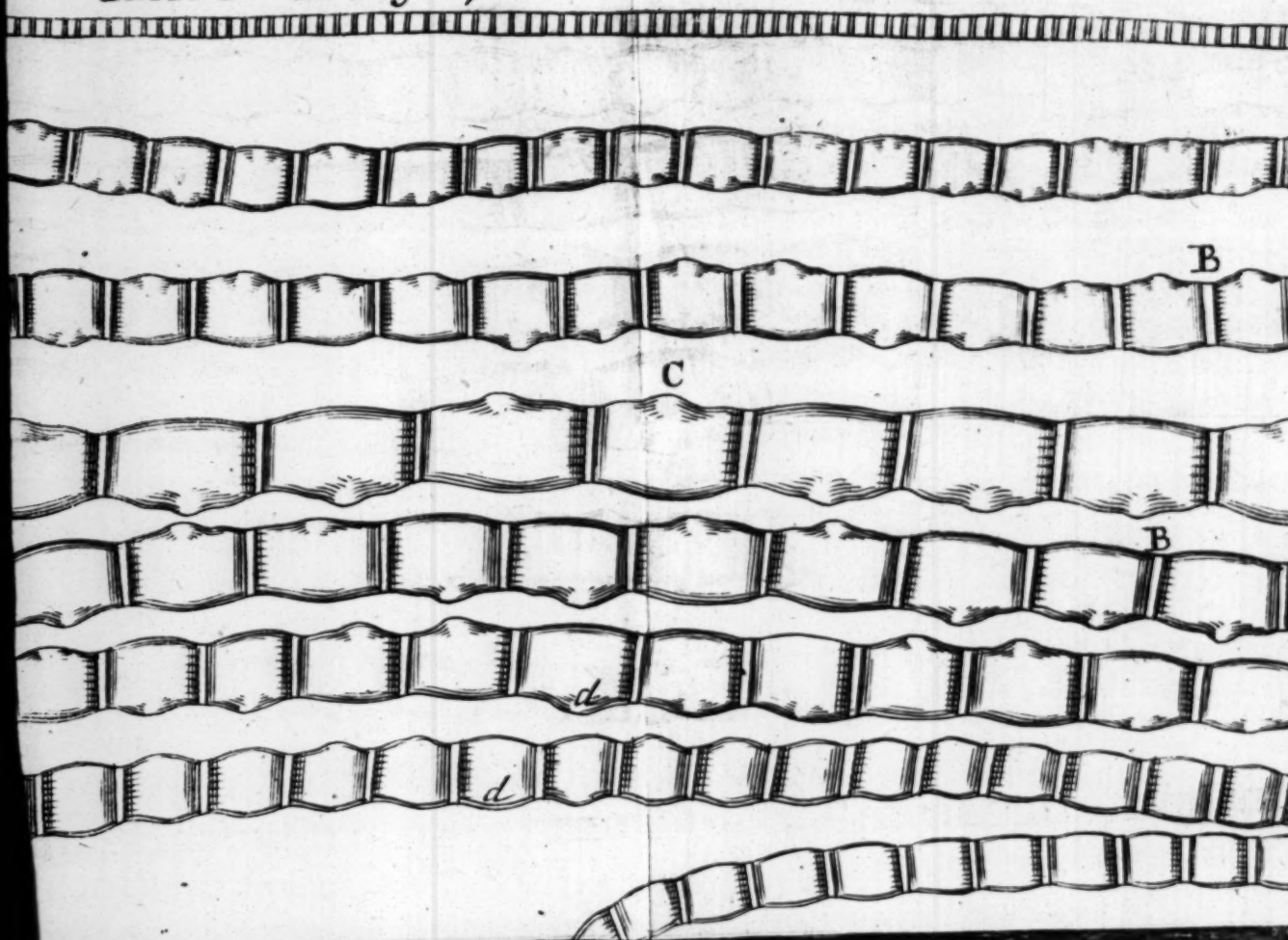
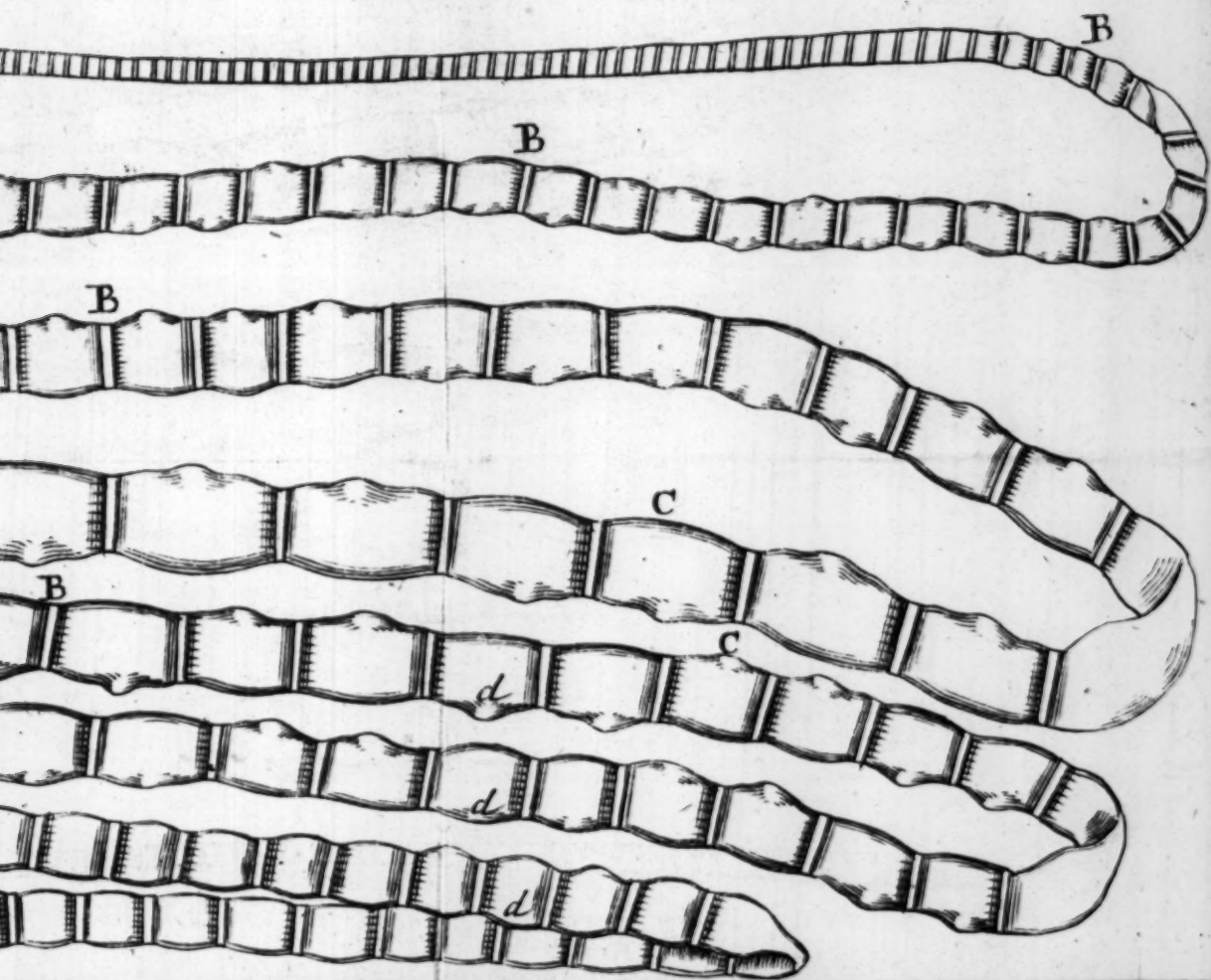


Table. 1st & second
Page 46.



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the ancient *Greek* and *Latin* Physicians ; for the
ians, as it has been before observ'd, and their
powers allow of a kind of Worms, which they said,
broad and small, or *broad and short*, call'd by
Gourd Worms, and observ'd that those *Gourd*
adhered together like a link, or Chain, nei-
do they seem to own any other Kind of *broad*
s. But the more modern Physicians admit but of
Kinds of *broad Worms*, which are both very long,
they have either made no Mention of the *Gourd*
s, that is the *broad and short Worms*, or taken
for the Excrements or Eggs, or Species of the
long Worm, or at least for the Figment of the
ians. The same Physicians denyed that the
n described by the *Arabians*, consisted of many
ms, and held that that Chain was only one
n, and that it was very long ; which Worm is
ther kind of *tape Worm* of *Platerus*, the *degene-*
base Worm of *Spigelius*, and the *Solium* of *Andry*.
this Opinion hath took with the modern Phy-
s, many of whom we have before produc'd
monies of, to the End of the Seventeenth Cen-
last past. Also *Gandolphus* a Physician of *Dun-*
of this Eighteenth Century, whose Observa-
on that *tape Worm*, hath been Register'd in the
Academy of Sciences, embraces this Opinion
some others.

MOST at the same time, viz. in the Year 1710,
came out at *Padua* in *Italian*, a small Treatise
his Subject, by the most celebrated *Antonius*
Guernius, by which, as with *Ariadnes* Thread
may draw ourselves out of this Labyrinth of
s. And therefore with that Authors leave I
pick out all those Places which may fit my
use.

' IN the Year 1706, says *Vallisnerius*, I went
 ' Dr. *Torquatus Vallisnerius* to see an Hebrew
 ' man at *Final*, in the Dutchy of *Modena*, who
 ' about 25 Years of Age, three Months with
 ' very Fair, indifferent Handsome, and of a
 ' cate Body. This Woman, as many Women
 ' her Nation are, was much troubled with the
 ' Worms, which had often made her Miscarry
 ' third or fourth Month. But when she was
 ' with Child, the Worms, which as often as she
 ' were so painful, and troublesome to her
 ' make her Miscarry, no ways disturb'd her.
 ' Woman often vomited, and voided by Stool
 ' ny of these Worms, as well single ones as
 ' link'd together, after the manner of a
 ' Chain; that it seem'd as a Wonder to the
 ' standers, who cou'd hardly believe that
 ' quantity of Worms should be contain'd in so
 ' and handsome a Body.

' IT happen'd that at the Time I visited
 ' had just voided a very long Chain of Worms
 ' and many other single ones; which gave me
 ' Opportunity to satisfy my wonted Curiosity
 ' by carefully inspecting them, and so much
 ' more, because at that very Time I had a
 ' Book sent me by a Friend. Therefore I
 ' that long train of Worms, so like the Chain
 ' scrib'd by the aforesaid *Andry*, and call'd
 ' had a Neck, a trunk of the Body, a Belly, pa
 ' Tail, and all the Parts which he describes,
 ' could not find the Head, which I very much
 ' fired; setting aside this, the train of Worms
 ' which I saw was as like the Figure of the
 ' or Chain, which *Andry* publishes, as one
 ' can be like another. The Figure which I
 ' care to have Drawn, may be seen in the 2d
 ' representing only a Piece of the very long

of *Gourd Worms*, which was voided by the *Jew*, and may be compared with that of *Andry's*. I was glad to take the Opportunity, which casually presented itself, and resolv'd to make the following Experiments, that I might be more certain; I easily divided with my Hands many of the Rings or Joynts, or the Nicks, so call'd by *Andry*, of that wormy Body, in which part it was more thick, and I observed they were more streight at the Sides.

ALL those Rings (or rather all those Worms) are made alike, and consisted of Membranous soft shining, flexible and slippery Matter. They are one of them, smaller in the upper Part than in the lower, and their arises at the upper End two little Prominences, which when press'd from underneath with the Fingers, jut out like little Horns or Hooks, or contorted Thorns, which becomes visible with the Microscope, as you see *Tab. 2. Figure 2, 4, 5.* By these Hooks they are tied fast to the lower-part, which is the hinder-part of the antecedent Ring or Worm, in which there are imprinted little Cavities, to receive the little Horns or Hooks: Moreover there are observ'd to be other little Horns, but smaller about the Mouth, I observ'd in every one of them about six Wrinkles of little furrows, according to the length of the Back and Belly, as may be seen in the Figures. The sides of every Ring, or Worm are in some Measure curled or wrinkled; and there is in the middle of them something like a Nipple, whose Center being perforated with a visible Passage, casts forth often some white Chyle, sometimes a limpid Water, and sometimes a yellow serum. See the same Table, the 2, 3, 4, 5, 6, 7, and 8th, Figure.

' ALSO, I saw without a Microscope in many
 ' of the Worms, which had been dead some Hours
 ' and lay upon a Glass, shining Branches of ve
 ' white Vessels, dispers'd throughout the wh
 ' Body, which was as clear as Chrystal; as y
 ' may See *Tab. 2. Fig. 9.* These Branches proce
 ' ed from a Trunk, which, was instead of the T
 ' ractick Duct, and which ran along the middle
 ' the Worms back, and from the sides of the fa
 ' Trunk, other lesser Ducts branched out, wh
 ' crept towards the Borders, but did not reach
 ' far. But some of their Rings were single,
 ' others again dispersed into many Branches
 ' that there appear'd frequent Conjunctions am
 ' them. Others were form'd like Vine-Lea
 ' and were twist'd so many ways, that they w
 ' not discernable; yet they all, or almost all e
 ' ed in a strait Line, not far from the Edge o
 ' Sides, like so many blind Guts. But could not
 ' the brittleness and tenderness of the Matter
 ' serve, whether when they were there they tu
 ' back again. Then I carefully inquired to know
 ' ther the middle Trunk terminated between
 ' proper bounds of the Ring, as it is call'd by A
 ' or whether it reach'd from one End to the o
 ' that it might be joyn'd with the greater
 ' middle Duct of the adjoining Ring, so that all t
 ' Ducts might continue, but I found it ended be
 ' the Rings united. I was willing to inquire
 ' to the Number of the Lateral small Ducts,
 ' found it not the same in all; whether this
 ' pen'd by some Sportings of Nature, or all
 ' Branches did not appear in all of them a
 ' same time; or because perhaps many of the
 ' length, all of them being as clear as Chry
 ' disappear'd, and became invisible to the Ey
 ' that at last the whole Body became transpa

sometimes I happen'd, (as I have been since confirm'd in my Opinion by other Experiments, which I made afterwards) to see those small Ducts on the one side blotted out and invisible, and on the other whole, and not chang'd (*See Tab. 2. Figure 9, Letter a*). In some they did not appear at all, whatever Diligence I us'd to see them, as the *Letter* demonstrates. Neither could I observe that they had any Communication with the Foramen of the Pap, though this Chyle, or Serum often distill'd from it; but this white knot of Milky branches, is neither visible when these Worms are first voided, nor after they have been in spirit of Wine sometime, or when they are dry; but at a certain Juncture of time, when the Worms are neither too moist nor too dry. *See Fig. 1c*. Some of these Worms seem'd on the 2d Day to be of a muddy Paleness, some of the clearness of white Horn, and others were of several different Colours. On the third Day, if laid at a cold and temperate Season on a Table, they begin to dry, as the 9th *Fig.* of the same Table shews, so that the Pap being quite contracted does not appear, they grow less, and the Colour is altogether lost, and but few of the white Vessels remain, though these Vessels are preserv'd longer in those which were more full and soft; yet when they are quite dry, they sometimes very plainly appear, especially in some one or other, which has been voided of a brown Colour, in which they had not been conspicuous before; but they soon become invisible, as the said *Figure 9.* shews, But that dryness or appearance of the Vessels, is compleated, either sooner or later, according to the greater or lesser degree of Heat of the Season, and the moistness, or dryness of the Air and Place; neither with

' whatever Diligence I us'd, were these Vessels
 ' be seen in all those Worms, neither were the
 ' Species or Size of the same, whether the Worm
 ' yielded all the juicy Matter, with which the
 ' are burden'd, or they were not fill'd with it,
 ' this Matter was distributed, or turn'd to Water
 ' afterwards those Vessels are clear and dry, and
 ' become invisible, and so deprive the Curious
 ' of the pleasant Sight, See *Fig. 10.* In short
 ' meeting with them, was in some measure ac-
 ' dental, and there is as much Leisure and Pa-
 ' tience required to find them, as there is to dis-
 ' cover the milky Vessels of the Mesentery, or the
 ' thoractick Duct in Dogs and other Beasts; which
 ' are to be seen only within a certain time after
 ' they are dead, or after they have fed, otherwise
 ' they are invisible. I was not satisfy'd to see them
 ' imperfectly, or confus'd, but made use of
 ' extraordinary Microscope, with which, I
 ' plainly all these Vessels, which were placed
 ' artificially, as you may See, *Tab. 3. Fig. 11.* Some
 ' of which branches cleave to the Trunk, and are
 ' the same that *Malpighius* observed in the tape Worm,
 ' which he treats of, in his *Posthumous Work*, on which
 ' Argument I shall say something hereafter.
 ' *Tab. 3. Fig. 12.*

' ALL the Figures of the first three Tables
 ' excepting the *Ascarides* in the third Table, represent
 ' sent the *Gourd Worms*, and the pieces of them,
 ' their various Forms, either as they are joyn'd
 ' single, and as they are examined sooner or later
 ' or with more or less Diligence, as they are larger
 ' or smaller, and according as they appear with
 ' Microscope, and to the naked Eye; from whence
 ' the several different Opinions arose in describing
 ' them, as it will appear by seeing the Tables.
 ' Moreover, having taken off the upper Coat

those Worms, I inspected into their inward Parts; and observed only with my Eye a vast Number of Eggs, which hung by very small Threads in Bunches, like Grapes. Every one of these Eggs consisted of many other little ones, all which hung by that Branch from which they came forth, like so many stalks that nourish them.

BUT before I divided that long, or as I call Vermicular Chain, I observed that it mov'd and contracted itself, like one single Worm; so that it would be sometimes contracted, and sometimes extended, appearing longer, or shorter, sometimes it would bend and twist like a Snake. In the mean while the *Hebrew* Woman voided many other such like Worms, but some of them were single, others joyn'd together, sometimes two and three, and five and more. I carefully observ'd that none of these Worms which were single, and were not joyn'd to any other Worm, did in any wise differ from those, which when joyn'd together, make that long Chain which was spoke of before, and accounted to be a very long Worm, as it appears from the Figures, 2, 3, 4 and of the 2d Table. These mov'd upon a Table after the manner of the other Worms, call'd ἀποδαν; curling their Fibres, and stretching out their Bodies, sometimes slackening, and extending the said Fibres, and sometimes bending them in the form of an Arch, like Water mov'd by a gentle Wind. When any thing hindred them in their Progress, they were like blind Folks, angry; and then the former Part of their Body was dilated, and the hinder became narrower; neither did they move their whole Bodies, as if they would go to the Right or to the Left, but as if their Heads was chang'd to their Tail, or the Poop to the Prow, they went back again, inverting

' the Motion of the Fibres, and retreating as ea-
 ' sily as they advanc'd, just as if they had a Head
 ' at both Ends. After the same Manner the Ca-
 ' terpillar crawleth, which for its creeping so fast,
 ' was examined with wonder by St. *Austin*, that
 ' great Philosopher, as I have observ'd in my Dia-
 ' logues. I put many of those Worms into Water, and
 ' observ'd them to be in several different Motions
 ' But we must observe, that not only those Worms
 ' which are voided alone single, did move thus in
 ' the Water, but also the single Rings of *Andry*
 ' *Solium*, after they were disjointed, mov'd thus
 ' also; for all the Experiments that I remember
 ' I ever made on these Worms, both single and
 ' chain'd together, were made all with the same
 ' Success. Some of these swam gently in Water, as
 ' Worms do, with a waving and peristaltick Mo-
 ' tion, and others were as stiff, as if they were Fro-
 ' zen; some when they were first cast into the Wa-
 ' ter, swam arch'd and bent in the form of an hal-
 ' Moon, on the top of the Water without any Mo-
 ' tion, as you may see in *Tab. 2. Fig. 6, 7.* and
 ' some were wound and roll'd up into Balls, like
 ' Millipedes or Hog-Lice. I threw several of
 ' them, when joyn'd together into cold Water
 ' some of which, being touch'd with Cold presently
 ' separated; but the others perish'd, as they were
 ' joyn'd together; they all liv'd about an Hour
 ' and became more flexible and active, but in
 ' a dry Place, or out of Water, they hardly
 ' liv'd half an Hour; when they were put in
 ' the Spirit of Wine, they presently emitted
 ' white Juice and dyed; but in common sweet
 ' Oil, they remain'd much longer; our *Petroleum*
 ' kill'd them presently, yet they bore the famous
 ' Oil against Worms, call'd *de Abacuch* much longer
 ' though in that they died sooner, than in the
 ' Oil

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Olive Oil, and were in this Oil more dry and wrinkled, and contracted than in any of the other Liquors. The next Day, the same Woman after very severe Pains, and gnawing of her Guts, voided in a bilious and melancholy Stool, many of these Worms, which when they were voided, crawl'd up and down, leaving a Slime behind them, like House-Snails, which Slime after it was dry and shav'd off, look'd like a hard and clammy Viscous; they did not go far above a Span and a half, before they grew weak and dy'd; but some of them, as soon as they voided, form'd themselves presently into Semicircles, and then became Motionless; and as soon as that milky Matter, which distills from the Pap mention'd before, was come from them they died. In these also I perceiv'd the same milky Tubes which were in the Rings of *Andry's Solium*; for I was very diligent in my Observations, though it is of no great Moment, whether they are single, or joyn'd together, since they are of the same Nature.

WHILST I curiously inspected both then, and since many of these Kinds of *Gourd Worms*, I observ'd two, which being something uncommon, it will not be improper to describe; for the Naturalists ought always to have present in their Minds, the saying of the great *Hippocrates*, *Nihil temerè fieri, nihil negligendum esse*; since as his Commentator *Vallesius* observes, Nothing comes by Chance, but every thing hath its Cause, tho' we may be ignorant of it. First, I took Notice that one of those Worms had two of those Dugs or Paps, one on each Side, and that they were both perforated in the middle, like the others. Whether this Worm was unnatural, in having two of these Membranes, or whether the other Dug was

' not a real one as I thought, or but a swelling
 ' as resembling one, or in short was another kind
 ' of Worm, I shall not venture here to determine.
 ' Secondly, I observ'd three of these *Gourd Worms*
 ' united together, but so intangled and twisted
 ' that I could not separate them without breaking
 ' See. *Tab. 2. Fig. 11, 12, 13.* But whether these
 ' Worms mutually joyn'd together, or whether ha-
 ' ving laid close together so long, as to eat one in-
 ' to another, by the flux of the Nutritious Juices
 ' there became a strict Union of the Parts, so that they
 ' could not afterwards be separated, as I once saw
 ' three Fingers of a poor Boy, which being burnt
 ' and afterwards neglected and bound up by his
 ' Mother, were perfectly joyn'd together, or whe-
 ' ther this was a sporting of Nature I cannot
 ' clearly explain. But how monstrous and strang-
 ' soever this was, it is sufficient to mention it; for
 ' it may be the time will come, when these Experi-
 ' ments on wandering Nature will bring many
 ' others to Light, which are yet undiscover'd.
 ' BUT to return to this *Jewish Gentlewoman*, who
 ' was the lucky Occasion of our Examining into
 ' those Worms, of which Sort many Physicians
 ' Note and long Experience have ingeniously
 ' confess'd they never saw one; moreover, she said
 ' that whenever she voided these Worms, she
 ' then felt great Gnawings and Twitchings in her
 ' Guts; but when they were united and joyn'd
 ' together, they were no trouble to her; sometimes
 ' after, thinking she had voided a very long frag-
 ' ment of her Guts, and being timorous, though
 ' it was not attended with any Pain, she sent for
 ' Dr. *Torquatus*, who at the Sight of so uncommo-
 ' an Excretion was amaz'd. This Substance which
 ' was something like a piece of Tape doubl'd and
 ' sow'd up on each Side, compos'd of a thick, slip-
 ' pery

perly, clear and mucilaginous Membrane, was two Inches broad, and above three Foot long, hollow within like a Conduit Pipe, and very flexible and clammy. It contain'd in its Cavities, a great many *Gourd Worms*, which were single, and not united; but of several Sizes, and all alive, the greatest Part of them, and they the largest Sort laid all a cross in this Tube, but the others which are the smallest, laid here and there without any Order, and when this same Tube was put into Water those Worms remain'd a long time in it. The Doctor that knew this Substance was not a Gut, when there appeared no Streaks of the Sanguinary Vessels, and other Signs; and he was the more certain of it, because the sick Woman was free from all Pain when she voided it, from which she would not have been, had it been a piece of her Guts. It happen'd that when I should have seen this curious *Phænomena*, now I was in the Country, where I was sent for by a Jew, whose Wife, was a fat and pale Woman, and voided such another Tube, the sight of which confirm'd the Truth of the other.

BUT our *Jewish* Woman of *Final*, took to expel this multitude of Worms, and to be freed from this obstinate Distemper, not only a few Purges, but even by the Advice of some very noted Physicians, almost exhausted the Apothecaries Shop. Yet all was to no Purpose, for the bigger she grew, the more plentifully the Worms abounded; but by taking the purging Waters, and some bitter Catharticks, mix'd with Specificks against Worms, many Worms, were voided alive and dead; so that the rage of these pernicious Insects seem'd for sometime abated: But they, when they were not to be rooted out of their deep and impure Nests, became yet again very troublesome.

THUS

THUS far *Vallisnerius*, adding moreover, that he had often seen these kind of Worms, and had made many Experiments on them, confirms all that hath been said of them before.

THEN he describes the *Dog Tape Worm*, of which we shall treat hereafter. And though the Experiments, which have been related before, seem fully to demonstrate that the *Solium* of *Andry*, was not one single Animal, but consisted of many joyn'd together, yet this ingenious Gentleman does not stop here; but confutes so plainly all the Errors of *Andry*, and takes away all the Objections, both of that Author, and all those who account the *Tape Worm* to be, that one Worm of the second Kind of *Platerus's*, that any one may see all the System utterly destroyed. I should be more Prolix, if I should prosecute all these Arguments; therefore I shall only make Choice of those which are considerable.

THOSE Worms have not, neither can they have, says *Vallisnerius*, when joyn'd together any internal Duct, which may be common to them all, or to many of them; because, though they are link'd and united together, they do not make one Animal, but many; for *Andry* himself confesses that he never saw such a Duct as reach'd from the Head to the Tail, and if he did but consider with himself, he ought by that to know, or at least suspect that his *Solium* was not one single Animal. Now when these our Worms are united together, they appear to be a very long Worm, if they had a Head or a Tail; because the greater ones fasten gradually to the small ones, and the small ones to them according to the proportion of the Hollows, and Prominences by which they are joyn'd, so that the Proportion must be very exact.

‘MOR

‘MOREOVER, ’tis observable, that neither *Andry*, or any other Author describ’d that Worm call’d by *Andry*, *Solium*, with a small Tail, but they all thought that the Tail we speak of, when it seem’d blunt and thick, was rather cut or broke off in the voiding, but the Notion is False; for that fictitious Worm hath no Tail, because it ought to be allow’d none. The wormy Chain is lengthen’d by the Worms sticking one to another; and as they Resemble the *Gourd* or *Cucumber Seed*; the hinder Part ought to be blunt, and not small and sharp at the End, like the ordinary common long Worms.

‘BUT who will say, continues *Vallisnerius*, that *Andry* found out the Head of that Worm; I answer, the Head of the *Solium*, but what he thought, he saw, was not indeed the Head; for that Globule, or roundish form’d Matter, which seem’d like an unform’d Head, ’tis probable was nothing but the Particle of an hard mucilaginous Humour, which the first Worm of that Chain held with its Clasps, whereas the other Worm, which it was link’d to had not the same. Neither does this ingenious Gentleman, meaning Dr. *Torquatus*, describe that Head with four Eyes, as the other thought; but since these two famous Observators do not agree, I fear least one, or both of them be deceived. Now knowing their Number and Figure, they ought, to prevent all Mistakes, to shew whether they were Eyes or Nostrils that appear’d here, Nature having given to no Creature, whether great or small any more than two Nostrils; as for the Eyes the Question is now in Debate, first, in Relation to the Number in some Insects, and, secondly, as to their Existence? First ’tis doubtful, whether the Worms in the Intestines, and other Parts of the Body enjoy the Benefit of
Sight,

' Sight, for they being condemn'd to perpetual
 ' Darkness, cannot in all likelyhood stand in need
 ' of Eyes; however, 'tis of no great Moment to
 ' know, but, in my Opinion it may very much con-
 ' cern us to know, whether the Figure accounted by
 ' this Gentleman to be an Head, had the form of
 ' an Head, Eyes and Nostrils. When once the
 ' Imagination is heated, we Think we See what e-
 ' ver we desire to See; so *Andry* being perswaded
 ' his *Solium* was one single Worm, and seeking af-
 ' ter its Head, believed he found it with its hol-
 ' low Prominence and other Parts. But how come
 ' it, that he makes no mention of the Mouth
 ' Certainly if this real Worm had both a Head and
 ' Eyes and Nostrils, or a Nose, it ought to have had
 ' a Mouth under that Nose. But I commend his
 ' great Candour, who when he could not discover a
 ' ny Cleft which had the least Appearance of a
 ' Mouth, he made no Mention of it.

LIKEWISE *Vallisnerius*, Congratulates the
 same Author on his Invention of the Eggs of the
 Worm, but he plainly shews how much Mistaken
 he was concerning their Nature or future being
 ' First, if those Excretions, which Resemble the
 ' Cucumber Seed, are voided by those Persons, who
 ' are tormented with the *broad Worm*, are accord-
 ' ing to *Hippocrates*, and *Aristotle*, nothing but
 ' Eggs found out by him, and his Followers, which
 ' grow larger in the Guts, and are the same as those
 ' of *Aristotle's broad Worm*, the Opinion is not False
 ' why then may there not be expected as many *Sol-
 ' lia*; but Worms of different Species ought to be
 ' excluded. From thence, *Andry* cannot say many
 ' proceed, since there is only one *Solium*. Now that
 ' there should be a different Species, is incredible
 ' and against the Laws of Nature, for 'tis impossi-
 ' ble for Turnips to arise from Cucumber Seed, Fer-

nel from Turnip, or a Spanish Fly from an Earth Worm, &c. What can be more? if we believe him, nothing is excluded from those Eggs. These Eggs, says Andry, when voided by the Solium, and laid in the Guts, increase dayly; but when there is not Aliment sufficient for them to display themselves farther, and to thrust out their own Worm, they themselves come away with the Excrement. Wherefore these Miserable Eggs are only blown up, and grow larger, but are so unfortunate, as not to be able to exclude their own Worm, moreover, he explains himself thus; for they may well want Nourishment, when the Worm that lays these Eggs eats up the Food they want; for we must take Notice, that this kind of Worm is nourish'd by the Chyle, and that the Worm which I saw when it was first voided, was swell'd up with this Juice, of which it yielded a great Quantity when put into Spirit of Wine. For as a great deal of Food yields but a little Chyle, which is known by the largeness of the Excrement, it is impossible for our Worm, which feeds on that Juice, to leave enough for so many Fœtu's or Eggs.

THUS far Andry, whose Arguments are plainly refuted by Vallisnerius, Who writes as follows.

FIRST, the Eggs of all Insects, generally speaking when once laid, do not increase; therefore if the Solium, as Andry himself confesses, are no bigger than a grain of Sand, How can one single Egg then grow to be as large as a Cucumber Seed? Surely he never saw the Gourd Worms, for if he had, he had known them to be real Worms, and no Eggs. Secondly, 'tis false that the Eggs, which Andry saw, should grow to that uncommon and monstrous Size, neither could the Brood be expell'd, or freed from the out Skin, for the want of the Chyle consum'd by the voracious parent; since the Eggs of all Creatures contain sufficient Nourish-

' Nourishment till the time of their Maturity ;
 ' if any outward Humour is convey'd within the
 ' Eggs, or filter'd thro' their Coats, 'tis very rare
 ' But there should flow so much Chyle between the
 ' Eggs of the *Solium*, as to make those Eggs which
 ' were at first invisible, and like Atoms, to grow in
 ' time to so vast a Size as the Seed of a Cucumber
 ' Why might not the Worms contain'd within those
 ' Eggs, being strong and grown to such a Size, break
 ' the Shell or Coat, and come forth ; for if the
 ' Coat is not broke, how can that Prodigy of a
 ' Egg, change its first Form which was round, and
 ' take upon it the Oblong one of a Cucumber
 ' Seed ?

' *Andry* says, that from a great quantity of
 ' Food, there arises but a little Chyle, and that too
 ' is consum'd by the *Solium*. How then can the
 ' Man or Woman live, or on what must they feed
 ' who hath such an insatiable Devourer of the Chyle
 ' within their Intrails ? Indeed our *Jewish* Woman
 ' man was something Pale and Slender, but was not
 ' so emaciated, as there was not Chyle enough left in
 ' her Bowels, to Nourish her, who at the same
 ' time was four Months gone with Child, and requir'd
 ' quired so much the more, yet did not Miscarry
 ' which Women do too often for want of Chyle
 ' but was tormented with cruel Twitchings and
 ' Pains. She went to Stool every Day, and eat
 ' with a good Stomach, and did not lose her
 ' Strength, so that that quantity of Chyle which
 ' ought to remain, was sufficient to Nourish the
 ' heaps of the *Solium's* Eggs, by which means there
 ' were always some, or more Worms produc'd ; but
 ' the greatest Misfortune of that largest Worm was
 ' that of so many thousands of Eggs, laid in
 ' Place so convenient for their Birth, he had
 ' Off-springs. Now answers *Andry*, it is call'd
 ' *Solium*

Solium, as all one and single, because 'tis the only one of its Kind, that is found in the Guts of Mankind. Therefore that Worm is both Male and Female, a Prince and a Commoner; and though he be single, yet he constitutes an universal People a Kind and Species. But indeed it may be understood in another Sense, since that that very Worm is a Series of Worms, so that if all these Worms seem to do any thing, he alone, though consisting of many may be said to do it, and may be call'd Male and Female, Prince and Subject; therefore we may conclude that that *Solium* was a true Chain of *Gourd Worms*; each of which, like all Insects, laid their own Eggs, which at their due time produced other *Gourd Worms*, unlike their huge fictitious Progenitor, only in being single and loose, whereas he was intire and compact, but if they are sometimes united together, and do appear to be one very long Worm, like their feign'd Father, they don't seem to be either false, or Worms that came from Eggs, which wanted sufficient Nutriment.

'NEITHER is the other Error of *Andry* more excusable, who thinks, that those Eggs are to be produc'd by no other Part of the Body than the Foramina of the Paps or Dugs, of which we have spoken already; as if he had forgot what he had said of them a little before; viz. that those Paps were as so many Lungs, by which the Air is drawn in, and serv'd instead of Wind-pipes. And he appears the more audacious, by calling *Malpighius* as Witness, asserting that the Silk-Worm consists all of Lungs from the Head to the Tail. But continues, *Vallisnerius*, I never saw any Animal, either great or small, that bring forth their Young by their Lungs, or even Canker-Worms, or especially Worms, which lay their Eggs

' Eggs at their Wind-pipes, which being many
 ' gape in their Sides; if so, these Insects should have
 ' Ovaries in their very Lungs; a thing intirely
 ' new, and unheard of by all Philosophers and Na-
 ' turalists. *Andry*, also said before, that his Worm
 ' when put into Spirit of Wine, yielded a great
 ' Quantity of a Milky white Liquor:

' Now that Liquor, as I observ'd in our *Jen*
 ' drop'd from the Foramina of the Paps, which are
 ' with *Andry* so many Wind-pipes, and from hence
 ' if we believe him, we may infer that those ap-
 ' tures, or pulmonary Passages were design'd
 ' to perform all the Offices that are perform'd in a
 ' other Creatures, by the three, or at least two
 ' distinct Ostiola, which are us'd differently, and ha-
 ' down from the internal Organs, so that they
 ' serve instead of the Podex, the Lungs, the Mouth
 ' and Uterus. In Birds as well as Insects, the
 ' Mouths of the Uterus, or those Ducts by which
 ' the Eggs are laid, do open when they void the
 ' Excrements, so that the Eggs and the Excrements
 ' are excern'd through one common Passage; but
 ' neither want, as 'tis observable, the Tubes
 ' Pipes of Respiration. Then *Andry*, to leave no
 ' way unessay'd, shows a new different way, if the
 ' first may not be allow'd, whereby the Eggs
 ' his *Solium* may be laid, viz. The Foramina, or some
 ' Passages, which lie under every single Ring, find
 ' those Rings may open and shut like the Gills of
 ' Fishes. But if it may be granted that the Eggs
 ' of the *Solium*, may more likely and probably wa-
 ' the Joints of the Rings, than the Tubes that re-
 ' ceive and emit the Air, yet there remains another
 ' great Difficulty; that there ought to be as many
 ' Joynts, or Clefts proper for the emitting of the
 ' Eggs, as there are Rings; for there is, in the *F*
 ' males, not only of Worms, but of all other Cre-
 ' tures, one Cleft sufficient for the great Work

' Gen

Generation, Some Insects are observ'd to take the Air by many Chinks or Pores; but multiply by no Female, nor lay Eggs, and we know the Poets feign'd a Monster with a hundred Tongues and Mouths; but we never read of one with a hundred Wombs, &c.

MOREOVER, *Vallisnerius* Jestling with these, and the like Expressions, opposes another Opinion of the same Author, where he asserts that his *Solium* rears up its Head and Neck to the Mouth of the Stomach, that he may Sup of the flower of the Chyle, which springs there; before it is mix'd with the Gall and embitter'd; since, as *Andry* thinks, 'tis not without cause that Worms dread Gall; for *Gall*, says, *Andry* himself, is obnoxious to all kinds of Worms, who avoid every thing that is bitter. In the Gall-bladder, there are found Worms, but they are only in those Bodies that were carried off by the Dropsy, whose Bladder was rather full of Flegm than Bile. 'But I, says *Vallisnerius*, do not think that Worms are so averse to bitter; let *Andry* but consult the Experiments of the celebrated *Redi*, and he may learn from them, that both *Earth Worms*, and ours will live along time in the bitterest Decoctions of *Aloes*, *Wormwood*, *Coloquintida*, &c. but they die presently in Water sweeten'd with Honey and Sugar, or any Sweets; the Reason of which I shall show hereafter when I treat of the Cure of Worms. Sometimes the Worms, which live for most part in those Vessels, by which the Bile is separated and cleansed, are found in the Livers of Sheep, Oxen, Deer and Cats, and in Livers of Men. I myself lately tasted of the Gall of a Sheep, in which there were many Worms swimming, which were fed by it; but that Bile, which I thought to have found very bitter, was sweet and like Flegm. Moreover, there are Worms which feed on Worm-

F

wood,

‘wood, Rue, and other bitter Plants; for I have
 ‘seen sometimes little Worms eating the Leafs of
 ‘the Garden Poppy and Tobacco, the Strength of
 ‘which Plants are sufficiently known.

THE Authority and bare Assertion of *Andry* not being sufficient to remove the Obstacle, he thinks to make it more Evident by many other Arguments, as well as this invincible one with which he finishes the Description of his Worm. His words are these. *The Motion of our Worm is sufficient Demonstration, that this was one single Animal for 'tis impossible that many so joyn'd together should move as to appear bent, and that all the Parts of the Chain form'd by them, should obey the Motion, unless they made one and the same Body. Besides the exact proportion of all the Parts of the Body removes all doubt of its being but one Animal.*

‘INDEED, answers *Vallisnerius*, I believe that the Worm describ'd by *Andry*, had various Motions; so that it might be bent easily, and the Part which was accounted the Neck, might be contracted, and might draw the suppos'd Body after it; yet all these things are not sufficient to demonstrate it, to be one single Worm. The Connexion by which, those many Worms which constitute *Andry's Solium*, are united together, is so tight and firm, that if the first of these Worms move, the rest of Necessity move in the same manner, the Fibres of the last being contracted the same way that the Fibres of the antecedent Worms are, like Waves, which are drove one by another. So many Men, or Boys were joyn'd fast by their Arms and one of them shou'd change his Station, either backwards or forwards, the rest will be mov'd the same Motion, by Reason of their streight Union. *Alianus*, in his History of Animals. Book Chap. 22. Observes, that Mice when they would cross a River take one anothers Tails in their Mouths

Mouths, and form a long Troop, so that when the first of them plough the Water, the hindermost are oblig'd to move and follow their Leader, and now that long Series of Animals might easily be accounted by the unwary, and distant Spectators one very long Creature. Thus Mice by these Stratagems, and by uniting their Strength escape all Danger; for there is a natural Instinct in all living Creatures towards their own Preservation, and there seems imprinted both on the greatest and smallest the fear of an unknown Death. Why then might not our *Gourd Worms* to avoid the obnoxious Humours, which flow in our Bodies, unite themselves together, and contrive so as to avoid the more easily the poisonous Humour, and to go the more safely. So many other Creatures, though they do not unite themselves, yet they Assemble in great Numbers, that when the Season of the Year changes, or any thing else falls out, they for their own Safety, may change that Air, and go into other Regions. But I have sometimes observ'd Bats sticking and hanging together; and Bees who also when they leave their old Nests, when grown too little for them, and seek a New one, do cleave together in great Numbers, and hang by their Wax; which is a certain Sign of their Swarming. The third and fourth Example of Animals cleaving together, is those Heaps of Swallows, which, as 'tis reported, are to be found in the *Baltick*. Now whether these Creatures cleave together of Necessity, to hunt those Juices that are hurtful to them, or to rest easy, or in short, it is a sort of Sport of them, is doubtful, yet 'tis certain that some kind of Creatures, as I have shewn by Examples are us'd to joyn one to another; therefore it is not a thing so strange in our *Gourd Worms*. Some may think perhaps that their joyning may be the Act of Generation;

‘neration ; but this seems farther fetch’d ; neither
 ‘do I know how one of these *Gourd Worms* having
 ‘its Head hid in the Tail of the other, should im-
 ‘pregnate the other, unless it had its genital Or-
 ‘gans inverted upwards like the Snail. In short,
 ‘we understand nothing here, unless we divine
 ‘since we may say, by way of Jest, we have not
 ‘been Conversant with Worms, neither do we un-
 ‘derstand their silent Language.

‘BUT, continues our *Author*, I have plainly show-
 ‘ed both in this, and many other of my Works
 ‘that all living Creatures, without any Exception
 ‘are propagated from the Seed of the Progenitors
 ‘which are like their Off-spring. And therefore
 ‘our *Gourd Worms* are propagated by the Seed, or
 ‘Eggs ; which has been observ’d both by *Andry*
 ‘and the curious *Malpighius*, and I myself have not
 ‘let pass unregarded. But these Eggs, which ly
 ‘between the Wrinkles of the Guts, and as it were
 ‘sat on the slippery Nest are Hatch’d, or excluded in
 ‘their due time, the little Worms which proceed a-
 ‘from them, are afterwards Nourish’d, and grow
 ‘till they arrive at the just Size of their Species.
 ‘But whether there are in this kind of Worm
 ‘Males and Females, or whether they may be
 ‘reckon’d among these Insects, in which according
 ‘to *Redi*, *Harderus*, *Peyerus*, and many others, there
 ‘is not any Sex distinguishable, such as the House
 ‘shell Snail, and the Slugs, which are thought to be
 ‘of both Kinds, I have not hitherto been able to
 ‘know. Only I know that in all the *Gourd Worms*
 ‘that I ever saw of the same Size, the Eggs con-
 ‘tain’d within them, were easily to be seen, and
 ‘that they were all made alike in their inward Parts
 ‘neither did I ever observe any Difference in any
 ‘one of them. The same thing is observ’d by *Redi*
 ‘in all the *round Worms* of an Human Body, except

‘fou

four, and which he once saw, and thought them to be of different Kinds, for there are Animals which do not Engender with any other of the same Species, and yet lay Eggs, as we have Examples of the many shell Insects, which cleave to Rocks, and the bottoms of Ships, and never stir from thence, yet lay Eggs, which at their due time produce other Insects like themselves, which also stick and cleave so, as not to be removed. We have another Example in a certain kind of Sea Worms, which singly bore Holes in the bottoms of Ships, and when inclosed in the Wood, and separated from the rest, become fruitful and lay Eggs, which produce their own Species.

THESE and many other curious things hath the learned *Vallisnerius* publish'd on this Occasion, from whom we have the Account and Discription of the *Gourd Worms* voided by the *Jewish Woman*, and further a Confutation of *Andry's* System of those Worms; and with as little Difficulty he refutes Dr. *Tyson's* running into some Errors as *Andry* does, concerning the Unity of the *broad Worm*, and not less mistaken in other things.

THERE are many Consequences, says *Vallisnerius*, taken from the Observations of *Tyson*, in his Treatise on the *broad Worm*. which are hardly Consonant to the Laws of Nature. For first, *Tyson* thought the Chain of *Gourd Worms*, which according to the Observation of some, was two hundred Foot long, or such a one as, he himself saw, which was about eight *English Ells*, to be one single Worm, which I shall here show to be false. Secondly, This learned Author thinks, that the occult Rise of that Worm, which does not proceed from an Egg, like other Animals, might be shewn as if it was that *univocal Generation* maintained, by the celebrated *Redi*, and others, which is false, if

our Worm lays the Eggs seen by *Malpighius*, *Andry* and myself. Thirdly, That the Rings or Joynts of the same Worm when they are broke, and thrust out of the Guts, generate again, and new Joynts grow to the Trunk, remaining within the Guts, as the Tails of Lizards are said to grow again, when broke. But this is as contrary to the Nature of Worms, since those new Joynts, which according to *Tyson*, grow to the rest, are the *Gourd Worms*, which first wander in our Intestines single, and then joyn themselves together as it were in Play. Fourthly, *Tyson* attributes more Mouths to his Worms, than there were Eyes, or Hands to *Argos* and *Briareus*, taking the Orifices of the Paps or Dugs, to be so many Mouths placed on each side; but both these Notions are false, for those Orifices cannot be Mouths, as I shall shew hereafter, neither are they, as he affirms, Situated on each Side alternately; but their Position differs, as we may see in the Figure, set forth by *Andry*. See *Tab. 1. B.* Indeed he is right, when he says these Orifices rise up and swell like Dugs or Paps, as we may see by the Fig. See *Tab. 3. Fig. 3.* But he thinks those Orifices, or Foramina to be so many craving Mouths, for these Reasons, first, that they are found generally fill'd with great plenty of Chyle; secondly, the Appetite, Thirst and Leanness, those Worms cause in Men, and other Creatures; thirdly, that there is no other Mouth to be found in this Worm, besides those Foramina, fourthly, that no other Use can be assign'd to these Cavities.

Now the Reader, may see, how much the learned *Tyson* was oversighted; for if these Foramina, as he was of Opinion, were so many Mouths, 'twas strange that he should not understand, that they were so many Worms joyn'd together. Every one of them had its Mouth, and from hence 'twas

that

that there were many Mouths of many Worms, united together; now if one Mouth is sufficient for a Wolf, a Bear or an Elephant, why should one Worm be allowed an hundred? But those Mouths, or rather Orifices are stored with Chyle, because the Chyle flows more Crude and Undigested in the last Agony of these Insects, when they are voided and dying. If a Man or any other living Creature had a Worm in his Bowels, that had a thousand Mouths, he would be always Hungry, Dry and Lean, by Reason of the multitude of those greedy Devourers, as I may call them, and it would be the same, as if he Nourish'd so many separate Worms, which when united would be as big as *Tyson's*; since that when they are divided, they eat no more than one single Worm of their Bulk might consume. Neither is it sufficient that *Tyson* says he could find no other Mouth in this Worm, when *Malpighius*, and I myself discover'd it in the narrowest Part of the Worm, just in the middle between the Hooks or Clasps before describ'd; for there can be no other Use assigned to the aforementioned Orifices in my Opinion, since the Excrements may be purg'd by these Orifices. But then I would ask him by what Foramen does that large Worm void its *Fæces*; for he observ'd a thousand Mouths, but takes no Notice of any *Podex* in that Worm. Therefore the Mouth discovered by *Malpighius*, is certainly what *Tyson* took for the *Podex*, unless he would allow this Worm but one Canal or Duct, both to receive its Food and expel its *Fæces*, which is contrary to all other Creatures. And the provident Industry of Nature must here be acknowledg'd in Constituting a Foramen, or Passage in the Sides of these Worms to void their Excrements (which is also for a different Reason bestow'd on the Testaceous kind of Snails, and others) that when these

‘ Worms unite themselves in a Chain or Link, they
 ‘ may not incommode one another with their Fe-
 ‘ ces.

‘ FIFTHLY, *Tyson* takes Notice of another Pro-
 ‘ perty belonging to this Worm, viz. That every
 ‘ Part of it lives, and even grows after ’tis sepa-
 ‘ rated from the rest of the Body; which thing
 ‘ he says, he has found true by Experiments, so
 ‘ that no Body ought to Question it; now I am ve-
 ‘ ry apt to believe it (though I know not how he
 ‘ should make Experiments on Animals, which will
 ‘ live no where long, but with us) since every one
 ‘ of these Parts is one distinct and intire Worm, as
 ‘ I have often before intimated, whence it follows
 ‘ that every one of those Worms can singly live
 ‘ grow and propagate their Off-spring, and also u-
 ‘ nite themselves to one another, so as to Form a
 ‘ large Link or Chain, which is not one great Worm
 ‘ but is compos’d of many. I have known a Caterpill-
 ‘ lar Dissected in vain, and cut in several Pieces to
 ‘ no purpose, every Part living, when divided from
 ‘ the whole, as it were to avoid the Danger that ap-
 ‘ pear’d from such Dissection, which I have taken No-
 ‘ tice of in my Writing; but this I know, that the con-
 ‘ tinuance of Life was, but short, and that wonder-
 ‘ full *Phænomenon* quickly ceased. I say, therefore
 ‘ that any of these Parts when separated, or divid-
 ‘ ed from one single Worm, as if it were divided
 ‘ from itself, can neither grow or increase, as it is
 ‘ evident from Experience if you lay one of these
 ‘ Insects on a Table, and cut it asunder. Sixthly
 ‘ I observe that the Head, attributed by this Au-
 ‘ thor to that fictitious Worm, and described by him
 ‘ is found in every single Ring or Division of the
 ‘ same Worm. Now if he had carefully examin’d
 ‘ those Divisions, he would have found the same
 ‘ Structure in the narrow Part of each of them, and the

‘ same

same Armour of Hooks, Hairs or Spears, as he calls them; by which all these *Gourd Worms* unite themselves and appear to the unwary Beholders as one prodigious large Worm. Now if that Author saw in every distinct single Ring of his Worm a Dug, with a perforated Pap, I do not understand why he should not likewise have observed the Head arm'd with its Pricks, since the Spires or Pricks of *Tyson's* are longer than those which I observ'd, either because he made Use of a better Microscope, or that the Spires of those Worms which are found in Dogs are larger than those of Men; for that which he saw, as he himself says, came from a Dog, and that which I saw was voided by a Woman. See *Tab. 3. Fig. 1, 2.*

THE Use of the Spires, is not, as I have already remark'd to Suck out the Food, but that these Worms may stick and hold fast by them, as with so many Hooks, lest they be voided with the Excrement. I am willing to allow this Use, since I see much such an Armament of Spires in the Heads of those Worms, which are found in the Foreheads and Noses of Sheep and Goats, and also I have found in the short Worms of Horses and Colts, these Spires, with which every Ring is surrounded, as I have explain'd at large in my *Dialogues*. Asses have such a kind of Worm in their Intestines, which *Malpighius* (a) mentions in these Words. *These Worms which break off in the smallest Part of the Body, hang so fast by their crooked Claws, which are like so many Teeth, that 'tis difficult to pull them out.* But I rather assign another Use to these Spires or Claws of our *Gourd Worms*, than that observ'd by *Tyson* and *Malpighius*, in the Worms of Asses; for I observe that these Spires or Claws are so made, that upon Occasion, our Worms may with them,

(a) De structura Glandulæ conglobatæ.

' them, lay hold of each other, and be so firmly
 ' united to one another, as to form a Chain of
 ' Link : Therefore this accurate Writer hath rais'd
 ' ther establish'd than vanquish'd my Opinion, and
 ' though we may disagree about the Unity of the
 ' Worm, yet we both agree in what relates to the
 ' Structure of the single Rings, or as I have it, the
 ' single and distinct Worms ; which self-same Structure
 ' cture, as it gives the greater Weight and Confirmation
 ' mation to my Arguments, so on the other Hand
 ' 'tis quite contrary to his.

THOUGH *Tyson's System* is thus refuted by *Vallisnerius*, so as there is no room left to Cavil, yet I shall here add a few things to Strengthen the First, I observe that *Tyson* found no Head in the Worm of eight Ells length, which he saw voided by a young Man ; and that the Worm whose Head he describes ; and which he himself says, was of the Gourd Kind, was not found in a Man, but in a Dog as *Vallisnerius* hath remark'd.

SECONDLY, that he himself doubts of its being a real Head ; since he said afterwards in the third Paragraph of his Dissertation, *That of all the Worms he ever saw, the Head was the most likely to be found in the smallest Part of the Body*, and then these Words are added by way of Parenthesis, *If that Worm can be said to have an Head*. Now I will show that in all Kinds of broad Worms, the Head is not always to be sought after in the smallest Part, therefore *Tyson* ought not to have reprov'd *Spigelius*, who thought the Head might be discover'd in the broader Part of his *Tania*. But allowing that true Head of the Worm, which he saw, was Situated in the narrowest Part, as indeed it was, this was the Head of the Gourd Worm that led the Troop, and 'tis proper that one Worm only and no others.

TTSO N might have found such an Head in every one of these Worms, if he had seen them loose and separate; but when these Spires or Claws which he describes, were not presently to be seen, he never thought of searching further after them, and their Head, but believ'd that these Worms when separated and single were nothing but the Fragments of a large Worm; so that at this rate every prejudic'd Opinion hinders us from searching and enquiring into the Truth. But 'tis strange he should still persist in the same Opinion, after he saw some of those Joints, as he calls them, separate and disunite themselves from the Body of a long Worm, when he thought it, while it was in his Hand; *several Rings, says Tyson, in his Paragraph, separated and disunited themselves from a Worm, which I found in a Dog, while the Worm was alive, and in my Hand.* This alone ought to have undeceiv'd him and satisfied him, that every one of those Rings were single and distinct Worms; and the more because those that remain'd united, mov'd along time after, and he could not say he found any Part in them torn or broke, neither could any Part be torn, since those Rings it seems, separated from the rest, of their own accord, without any external Violence; so that cannot here be said, as it is wont to be, of the longer or shorter Fragments of the Worm, call'd the *broad Worm*, voided by sick Persons; that they were broke and divided from the other Part of the Worm, by the force of Medicine; since I think 'tis not said that any Medicines were given to this Dog, that was not Sick before; neither doth this Author say, that those Rings were divided or separated by any Accident or Endeavour of his.

To this Argument or Sign, I may add one more certain, taken from the Spires or Pricks that are in all the Rings. For if there be Spires or Pricks
ob.

observed by him, to be in the foremost Part of the first Ring, which according to *Tyson*, is the Head; they are also observ'd to be in the fore Part of every single Ring, when they are separated and disjointed, and we ought to be perswaded that the Nature of all those Rings, are the same, and that every one of those Worms, call'd Rings, are not distinct Pieces of a fictitious Worm, but that they are all real and distinct Worms.

Vallisnerius plainly saw, and describ'd, particularly these Pricks, or Claws in all the Rings, and *Tyson* had seen them, if he had removed the Microscope, and examin'd all the others when separated, as diligently as the first Ring. But some will say, that first Ring as we call it, was different from the others, if we mind *Tyson*, who calls it a Head, and not a Ring.

BUT that which *Tyson* believed to be the Head of the Worm, was a whole intire Worm, the Captain of the Troop, which appear'd *small* and *round* whenever he stretch'd himself out by the Extension of his Fibres, and as he Contracted them, so he became *broad*er and *flatter*. Therefore that first Ring did not differ from the rest in Form and Shape, but only in Size; since as our Author confesses, those that were nearest the End or Tail, were both the longest and broadest, whereas the Foremost were the shortest and slenderest; but we must take Notice that 'tis otherwise in the other Chains of *Gonorrheal* Worms, voided by Men, such as that describ'd by *Andry*; for in this Chain, the Head or Neck was not only small, but also the hinder Part, which was thought to be the Tail, was much smaller than any Part of the Body. The Reason of this Difference seems to be this, in these kinds of Chains the Worms proceed from the small ones to the great ones, to the middle of the Chain; but from the middle to the End or Tail they grow smaller and smaller, so that

the smallest in the Link are at both the Ends; that by these means, those that are lesser of the Sort being link'd, some at the Beginning and some at the End of the Chain, they may the more easily, and gradually cleave to one another from the Fore-part to the middle, and from thence to the other End, and the strength of the Troop becomes greater than if all the small ones were link'd together. Neither ought we to think it strange, that the first Worm should sometimes be fix'd so fast in the inner Tunick of the Gut, as according to *Tyson's* Observation, not to be drawn from it; since no other Worm, to which it might cleave precedes it, and therefore it follows, that it should fasten on the Tunick of the Gut, with the same Claws, wherewith the following Worm sticks to it, when ever it would withstand the force of the descending Excrement, or resist any other violence.

Now I come to the Question started by *Vallis-rius*; *I should be very glad if Tyson, or any other would show me any Passage or Hole, whereby that large Worm voids its Faces; since he takes Notice of a thousand Mouths, but mentions no Podex in that Worm; but his Author expecting this or such another Questions says Paragraph the sixth, these Insects Suck nothing at the Chyle from which there is but little Dregs.* But Children, which are fed with nothing but Milk, which differs very little from Chyle, have frequent and plentiful Stools, Why should not those Insects concern the Faces from the abundance of Chyle, which they devour'd? Every one sees how vain this Answer is; but we are all too apt by defending one error to involve ourselves into many. The Opinion receiv'd among many Physicians, at the same time when he Writ, that the Worm call'd the *Round Worm*, was a very long Worm, occasion'd *Tyson's* first Mistake. Therefore to uphold this Opinion,

pinion, he assigns an Use to the Orifices he observ'd in the Sides of that Worm, which is repugnant to all the Laws of Nature, maintaining that these Orifices not caring how many they were, were for many Mouths, adding a third Error to that second to oppose the Difficulties rais'd from the want of Passages, whereby the Faces secreted from the Aliment receiv'd in at those many Chinks might be remov'd; as if a Creature that Feeds plentifully by six hundred Mouths, should have no visible Pores. But that Mistake of his may seem wonderful wherein he believ'd that Series of Worms joyn'd together, to be one Worm; if any solid Argument may be brought from his Observations, by which 'tis very plain, there were many Worms in that Continuity, so that by opposing this Author he may be rather said to defend him. I desire any one to read his own Words.

WHOEVER reads them must understand that those Joynts, as he calls them, were so many real Worms. Another Error of his is, that though he knew there were two Kinds of *broad Worms*, yet he confounded them, and attributes those things that are proper only to one of them, to both; and therefore he would not have argued against *Spigelius*, *Tulpius*, and other Authors, if he had remember'd the Difference between the two Kinds; neither would he have made use of their Testimony to the corroborating his Hypothesis, if he had understood that they had treated on a different Subject. To this Error I can add another which proceeds from it; which is, that he takes no Notice of the *Bag of Bed*, in which sometimes the *Gourd Worms* are contain'd, and which he confounds with the Worms themselves. As these Mistakes or Errors of this Author, which are very common to many other learned Gentlemen, ought not to be conceal'd, lest any other

her unforewarn'd should be deceived in the like manner; so I cannot but commend his Modesty, since he ingeniously confesses, that what he hath laid down are merely Conjectures, and that he will make no Difficulty in receding from his Opinion, when things shall be set in a clearer Light.

BUT let us return to *Vallisnerius*, to know of him, after having refuted the Opinions of *Tyson* and *Andry*, what may pertain to a fuller Knowledge of the *Gourd Worms*, and observe him examining three things on this Argument; First, *Where the Mouth of our Gourd Worm is situated*; Secondly, *To what End or Purpose those Dugs or Paps were given*; Thirdly, *What this Bag or Bed is, wherein those Worms are sometimes found inclosed, and how it is generated.*

To open a way to resolve the first Question, I am advised by that Author, to quote the following Paragraph, out of the celebrated

Malpighius. The Tape Worms, says

(a) *Malpighius's* Posthumous Works,

Malpighius, (a) whose outward Form ma-

Authors have delineated, and of

which I shall observe some few things, are frequently found in Men and very often in Dogs, inclosed within pulsataceous Matter like Chyle in the Gut *Jejunum*; and it is certain they are in Animals composed of many Rings. They have an Head, in which there appears two Amours, which probably are Eyes, cover'd with their eyebrows. At the Tip or Point there opens a Mouth, out of which there are crooked Teeth, placed up and down; which appear by the rubbing a little Ink on them, and then wiping it off again. There was no Cavity or belly to be perceived; yet upon taking off the outward coat, there were white and strange Circumductions, or windings about the Vessels in every Ring, which did not, I saw, hang from a continued common Trunk extending through the whole Body. They were full of white-mice, and at the Ends of them, there seem'd to hang little

little globes.

(a) Of the O.
rigne of
Worm: pag. 99.

Vallisnerius explains this Place in the Words; Observe (a) says he, how doubly this wary Writer speaks on this Account, fair, and how wonderfully his Thoughts confirm what I have said before. *Malpighius* calls this Worm by the Name of a Tape Worm and without doubt that same Worm, which he saw, was not one single distinct Worm, but rather a link of Gourd Worms, since we often meet with Gourd Worms in Dogs, sometimes united and link'd together, and sometimes single and alone. First I am induc'd to believe this, from that ingenious Description of this worthy Gentleman, since he observed the branches of the Vessels full of Chyle, which I described before; and which Branches, he says; did not hang from a continu'd common Trunk, extended through the whole Body; by which Specifick sign'tis obvious, this was not one single long Worm, but many Worms joyn'd together which this Ingenious Author Inspected. But those little globes, which he thought he saw hanging, were nothing but the Clusters of Eggs describ'd by me, which did not see hanging on Stalks or Branches, neither does *Malpighius* affirm it, since he does not say that they hang, but cautiously that they seem'd to hang. Lastly, the Mouth armed with crooked Teeth placed up and down; or rather the Claws, which he takes Notice of, in the Fore-part of the Worm, were probably, nothing but crooked Horns, which I describ'd, and which the Gourd Worms catch hold on one another for how should he have found out and seen that Mouth with the above mentioned Teeth, and I not have found them. Neither was *Malpighius's* Figure of any use to me, in discovering them, for 'tis false, that it Resembles more the Head of a Skeleton, than a Worm. (See Tab. 3. Fig. 4.) from whence as I advised before, ought as little as can be, to trust to Figures. 'Tho

' Worm

Worms, (b) says *Vallisnerius*, a little farther, have their Mouths situated in the upper and narrower Part of the Body, as I have often remark'd; though *Tyson* thinks it to be in the Side, that is, in the Foramen of the Dugs, of which I have spoken before. And I am brought to be of this Opinion, as well because I have inspected, that Mouth with my own Eyes, as also because I have often seen those Worms fall, but remark'd that I never saw them fall sideways, and with the Dug foremost, which if it had been the Head, would have happen'd. These Worms fall backwards and forwards; but the same thing is observ'd in the Catterpillar, and other Earth Worms, which we are sure have but one Head and Mouth, placed in the upper Part of their Bodies. But those Worms fall both ways, by the two Fibres, which bend both forwards, or backwards, but not on either side; and we may observe something from the peristaltick Motion of the Guts, in larger Creatures, which moves or may move both upwards and downwards. But all these Things depend upon the mechanical Position of the Fibres, and the Spirits that support and moisten them. Now all those dark and obscure Things that are seen in other Creatures of this Kind, may be clear'd by Authors that treat on these Things. I only observe that those broad, short and flat Worms in the Gall-Vessels and Livers of Cattle, especially Sheep, and which are a kind of *Gourd Worm*. I say, I observe that these Worms have their Mouths in the straitest Part of the Body, and that they have the other Hole or Passage, by which they void their Excrement, situated just where the Navel is, as we may see by *Bidloc's* Anatomy of them, and from *Leuwenhoek*. But the Worms that breed in the Noses and Fore-heads

heads of Deer, Sheep and Goats, and which have those very same Spires in their Heads, as they are described by *Tyson*, have also their Mouth situated between those same Spires. So the aperture of the Mouth is placed between the

(a) See our Author's Dialogues written in Italian, by the Title of *Gallerio di Minerva*.

Spires, in another kind of the Worms (a) which I have elsewhere described, infesting the Guts of Cows, and which Worms are not only rounded with the like Spires in the first Ring, but in every Ring; where

situation of the Mouth is the same with that of the Worms in Asses describ'd by *Malpighi*. Therefore if that whole Species of Worms, which are in some measure to be reckon'd among *Gourd Worms*, have their Mouths on the top of the Head, which is the narrowest Part of their whole Body, I don't see why the Mouth of our *Gourd Worm* should be placed on their Sides. This would be monstrous, if we, with *Tyson*, should have attributed a thousand Mouths to our Worm: For a Hole or Passage in the Side may very well be assign'd for the purging of the Excrement, as we see the same Thing in Snails, and many other Insects that live on the Land, or the Water, both testaceous and others; besides provident Nature ought to have placed this Passage so, that when *Gourd Worms* united themselves together, they might not incommode each other with their Excrements. But some bitter Antagonist may perhaps object, that our *Gourd Worms* cannot feed or flourish'd, if the Mouth of the one is so fasten'd to the Hinder-part of the other. To whom I answer, first, that they may be fed by the Chyme, which they swim, and which they may easily cleave to one another as by their Sides as by the Middle. Secondly, that those Worms, when they joyn themselves

together, have some design of Flight; so that they may not want Food, of which they have plentifully fill'd themselves, as 'tis Natural to other Creatures, when they move from one Place to another; as we see by the quantity of Chyle, with which those Worms are at that time turgid and swell'd with.

FROM hence, says *Vallisnerius* we proceed to the second Question, *To what End or Purpose are those Dugs, which are in the Sides of the Gourd Worm, open'd or plac'd there?* The Foramen or Passage which is Conspicuous on the top of the Dug is for the Worms to void their Excrement by, according to *Andry* and *Tyson*, who observ'd with me that the crude Chyle, of which these Worms were full, came forth this way. This evacuation of the Chyle is to be ascrib'd to the weight of the cruder Air, to which those Worms were expos'd, when they were before in a warm Place, wherein there was not so great a pressure of Air, from whence whatever Chyle is in the Vessels is easily express'd, and they become relax'd and flaggy; and afterwards ensues their Contraction; but I think I have discover'd enough of the Orifices of the Windpipes, which were inquired after no further than *Andry's* System.

THE Solution to the third Question, concerning the Bag or Mucus, in which Gourd Worms are inclosed, is this. Dr. *Lancisius*, the Pope's Physician thinks, that a Bag or Mucus, which is describ'd by *Vallisnerius*, and very ill by *Gabucinus*, of whom I have already spoken, and (a) which was taken to be the broad Worm of the Ancients, to be for the most part a conceal'd Juice, not unlike the *Polypus* in the heart and Arteries; *Vallisnerius*, who is of this Opinion, thinks, that some Juice coming from the

(a) See *Vallisnerius's* Epistles that are annex'd to his Work of the Original of Worms.

Worms themselves contributes to the formation of that *Polypus* besides the Lymphatick Juice that destills from the Glands of the Guts. (a) This fistulous *Polypus* may grow, says 'He, from a congeal'd Juice, which may come from our Worms by the Foramen, or Orifice which we have so often mention'd. Perhaps when these Worms lay their Eggs in this Bag, they spill with it a mucilaginous Matter like a thin Glue; such as is common in Fishes, Frogs, Toads, Effs, and other Insects; for these Insects form as it were, a long clear, and glutinous Jelly in the Guts, from almost the like Matter, which serves afterwards for a delicate Nutriment to the young Brood, like Milk. Now the Authors who have writ of those *Polypus Beds*, as I may call them, say that they contain not only the grown Worms, but also their Brood; I myself observ'd the same in the Jewish Woman.

So far *Vallisnerius*. Neither does that Body which was voided by a Boy of thirteen Years old, and which (b) *Zacutus Lusitanus* Treats of, in the following Words, under the Name of the *Tanien* seem to differ from that Bag or Bed.

A Boy about thirteen Years of Age, who was tormented with Worms, was one Day taken with so great a Pain in his Belly; which encreased so for two Hours, attended with Faintings, that the Boy wish'd he might die. The Physicians took it for the Colick, and the sick being spent, and weak for want of Sleep and Food was dying; but being dry, I gave him a little white Wine mix'd with warm Water and Juice of Garlick, with scruple of old Treacle, and in an Hour after, he had little Rest; and four Hours after, he voided at Stool with cruel Gripings and Pains, a broad Membran which you would say was a Tape Worm, about the

(a) Pag. ibid.
116.
(b) De Princip. Medicorum
Hist. lib. 2. Hist.
68.

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Tards long ; something thick, and four Fingers in breadth, of a red and black Colour. When I put this into a Viol of Water, it contracted itself. After this, the Boy recover'd, and was afterwards preserv'd from this great Evil by Wormwood-Wine. Thus far Lufitanus. But while we are speaking of these kinds of Bags, those membraneous Bladders come in my Mind, in which Physicians have not once taken Notice, that the Round Worms when heap'd together, are contain'd.

WITH these Vallisnerius concludes his description of the Gourd Worms, and puts an End to all Controversies on their Nature. Now we come to those Worms which were first indicated to us by the Arabians and their Disciples, which have lain for almost these two hundred Years in oblivion, and are unknown to most Physicians ; and which are set forth to us very plainly in a Work of a very Industrious Author, wherein we see the Error of those, who accounted Platerus's second Kind of Tape Worm, one Worm, discuss'd ; and that there were several Causes of that Error of Ignorance ; since these Worms are very rare, and there are many, tho' very knowing Physicians, who never saw them, and others again, who have inspected many of them, both single and united together, with little Care and Attention ; and those, I think, who mention them without ever seeing them, are not proper Judges. Among these we may Reckon those Writers, I have already Remark'd, who pronounc'd the Gourd Worm to be only a Forgery of the Arabians. Those who saw our Gourd Worms not single and separated, but united and link'd together, might easily be led into an Error, by that Chain's Resembling a long Worm, and led into one, as to believe it to be one Worm. Neither was this the only one ; since they thought the loose and single Gourd Worms, demonstrated by other Physicians

that had seen them, to be the Eggs or Excrements of their long fictitious Worm sticking together like the white *Dogs-turd*. That late Mistake was occasion'd by a Figure of a Chain of *Gourd Worms*, set fourth by *Cornelius Gemma*, and afterwards describ'd by *Aldrovandus*, *Spigelius*, and others; which Figure at first was drawn by a bad Hand, and was in some Measure liker those Excrements, hanging together, than our *Gourd Worms*. For no Body ever saw Worms, like these Excrements, or such a Worm as that delineated by *Gemma*. *Tyson* says, in a Worm, which came out of the Guts of a Dog, the Fore-part of those Rings was very small, the Middle broad, and the Hinder-part small again, so that those Rings in some Measure were like the Gut of that Worm set forth by *Gemma*, but this he observes to be only in some Rings, not in all. (a)

(a) See *Tyson's* Dissertation, Parag. 3.

Neither are the *Gourd Worms* to be confounded with the Pieces of the long broad Worm of *Platerus's* first Kind, of which Worm we are about to Treat. Some who never saw these our Worms link'd together, but single and distinct, take them for the *Ascarides*, or some odd Monstrous Worms, not thinking of the *Gourd Worms*, nor of the Chain, which they sometimes form, as appears by the fourth Chapter.

THEREFORE rejecting all these Evidences, let us abide only by those Authors, or at least prefer those, who have seen these *Gourd Worms* both single and link'd together. The first of these after the *Arabians*, seem to have been the *Reconciler*, *Shaddus*, *Alexander Benedictus*, *Benivenius*, and others before mention'd, and chiefly the Illustrious *Vallisnerius*, by whose Industry those so long unknown and undoubted Worms have been perfectly known, since he not only inspected them once or twice, but often; and loosen'd and separated them when link'd together, and when single hath evident

ently shewn that they are united by Nature, than which there cannot be a more certain Proof, I myself have often seen those Worms, which were voided by a Serving-Maid, sometimes single, and sometimes many of them joyn'd together, but *Vallisnerius* hath laid down this thing so plainly, that his evidence is as good as a thousand, and therefore we need to inquire no farther into that kind of Worm; yet there are many things to be inquired about the Rise, and Original of them, and many other Worms; but of these we shall Treat more communously in another Place hereafter. Now whether there is another kind of *Gourd Worms*, different from the former, requires our Consideration, from the Mention made by the learned *Simon Pauli*, of a species of *Gourd Worms*, hitherto describ'd by no one, which came away voluntarily from the Anus of a Butcher to the Number of fifty and upwards, Hairy, bloody and of an Ash colour, like Chesslips or Millepedes, and sometimes they were brought up by Vomiting: Thus much for *Simon Pauli*; but I wish this author had describ'd these Worms more accurately, which Worms if they were bristly, or only differ'd in this from the *Gourd Worms*, shall be reckn'd among those extraordinary Worms, of which we shall Treat hereafter.

BUT before we lay aside the *Gourd Worms* in the Intestines of Men, it will be proper by the way to mention, by Reason of the Affinity, the *Gourd Worms* in the Livers of Sheep, of which *Vallisnerius* hath spoke of something already, and which are describ'd by *Redi* in these Words; The Worms of the Livers of Sheep, call'd by the Italian Butchers *Biscouole* bear the Resemblance of the Gourd Seed, or rather of the little small Leaf of the Myrtle, having a little of the stalk belonging to it: They are of a white or milky Colour; and many very fine Branches

of little greenish colour'd Vessels, or Ducts are seen thro' them. Their Mouth or (the other Foramen) is round, and situated in the flat Part of the Belly, not far from that End of the Myrtle-leaf, which looks like the Stalk, of which before. These Worms are often found in the Gall-Bladders of Weathers, and not only there, but also they swim and live in all the other Vessels of the Liver, except the Arteries, in which I never saw any Worms of this Kind. I think that they breed in the Gall-Bladder, and by their gnawing, open themselves away to pass into the blood Vessels. And if they encrease much in their Number, they feed on the inward Substance of the Liver, and there make little Holes, in which the Blood mix'd with the Bile is swallow'd and overflows, giving it a dusky livid Colour, and a bitter Taste; therefore the Livers of those Sheep, which are troubled with these Insects, ought to be rejected, tho' they are never so well cleans'd and purg'd from filth by the Butchers, who sell them. Thus far this Author. See Tab. the 9th. Fig. 2.

THE same Worms are mention'd by many other Authors, among whom we find Bidloo, (a) from whose Observation this Argument, I shall set down what follows. 'That this Narrati-
' on of my Observation, and its Order,
' says my Author, may be rightly un-
' derstood, I shall first speak of the
' Body and Disposition of this little
' Animal. Secondly, of the Places, wherein 'tis
' discover'd. Thirdly, of the Number, Rise and
' Propagation of it; and Fourthly, I shall endeavour
' to demonstrate, that these and other Crea-
' tures, which are in the Liver and other Parts of
' the Body, are the Causes of many Diseases and
' their Symptoms.

(a) Bidloo's
Observation of
little Creatures
found in the Li-
vers of Sheep
and other Crea-
tures, inscrib'd
to Antonius
Leuwenhoek,

FIRST, that the Figure, Circumscription, and likeness of these little Animals, which likeness, excepting them already mention'd, is taken from that of the Herb Two-pence, and the likeness of the Horse-leech, it is very like our Sole-fish, and the Flounder, as appears from the first Figure, the Letter A shewing the size and back of this Creature, which is a little crooked. B shews the Belly. C shews its first Off-spring in two different Prospects. E and F shew both Prospects of this Animal according to the Proportion in the Microscope.

THIS Disease hath few outward Signs, whereby it may be known, since the Animal that labours under it is sometimes Fat, and very lively, the state of its Liver is not to be found till after its Death, and then these little Creatures are seldom found alive, because they can bear no Cold, nor Liquor wherein they may be wash'd, without danger of dying. Yet I have in the Year, 1698, on the 13th of March, when I us'd to go to Slaughter-Houses of Sheep, seen these Animals alive, and in like manner almost at the same time, a Kind of very short thick Worms in the Liver of a Cat. When they begin to grow cold, and thereby are destitute of their visible Motion, they recover, by being put into a warm Hand or the Liver being held by one. Their Motion is, very like that of some Fishes, which we shall presently describe, that is, they seem to move like Waters, when they are not broke on their Surface. They creep, and are wrapt round the Edges of the Body, after this manner, first the Head is brought to the Trunk, the Body is expanded according to its breadth, and afterwards is extended according to its length.

THEY

‘ THEY are of a brown yellow Colour, flat in
 ‘ the Belly, and of a more pale Colour on the
 ‘ Back; the whole Skin is Rough, and is invi-
 ‘ ron’d with those Pricks and Points, and is clear
 ‘ and almost transparent, so that you may on each
 ‘ side very plainly distinguish the Bowels and
 ‘ the Vessels. They have an Head sharp and flat
 ‘ with a Mouth jutting out, almost like the Carp.
 (See Tab. 12. where the Letter G shews it in its enlarged
 ‘ Proportion.) The Eyes H and I and which are
 ‘ very prominent are cover’d with the Cartilagi-
 ‘ nous Welt or Circle K, and both plac’d on one
 ‘ side of the Head, which is a thing common to ma-
 ‘ ny Fishes of this Shape and Form.

‘ THE Heart is so nigh the Head and the Inte-
 ‘ stines lie so joyn’d to it, that I doubt whether
 ‘ there is any thing comes between, which is pro-
 ‘ per to almost all Kinds of Creatures, whose Head
 ‘ seems distinct from the Trunk. Two Vessels
 ‘ come from the Heart, and extend themselves
 ‘ thro’ the whole Body, leaving the broad Gut in
 ‘ the Middle of the Back, according to its Length,
 ‘ as we may see under the Explanation of the Letter
 ‘ L. Between these little Vessels there are plac’d
 ‘ small Tubes or Filaments, in which there is no Li-
 ‘ quor to be seen. In these Vessels there are found
 ‘ two Sorts of Liquors, in some a Liquor of a brown
 ‘ yellow Colour, and sometimes a Purple; in others
 ‘ of a pale Green, but both vici’d, nevertheless flow-
 ‘ ing, tho’ the Creature be dead, from the Hinder-
 ‘ part of the Body, when lifted up, towards the
 ‘ Heart, and from thence raising the Head, towards
 ‘ the Hinder-part. Some who beheld this Demon-
 ‘ stration, wondered that this Reflux should be be-
 ‘ stow’d on these Animals when alive, rather than
 ‘ when they were dead; since the Liquor is found
 ‘ thinner in them that are alive, than those that are
 ‘ dead; but the Reason and Effect of this Phæno-

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menon plainly and clearly show'd them the Uses of these Vessels which convey this Liquor, and their Motion by the strength of the Heart.

THE Intestines are open'd on the Right-side of the Body, just below the Head, which Place is the Aperture which, by ill Custom, is call'd the Navel in Fishes; and the Guts are very straightly compress'd together, and bound as it were in a clew or bottom. A little blackish Ball, about the beginning of the Guts, seems to me to perform the Office of the Liver; between which, and the Guts themselves, I discover'd in all them I view'd a vast Number of Particles, like Eggs, which you mention'd to me in your Epistle; and I find also that a Hundred of these little Bodies, tho'joyn'd together, are hardly as big as a small grain of Sand, but are of a redish pale Colour, these little Bodies I look'd upon as little Eggs, or rather if you will a knot of Eggs; though I used all the Diligence I could, yet I could not be thoroughly satisfy'd of their Sex. I was oftentimes very doubtful, but at last I concluded, either that 'twas very likely that these Creatures were of that Sort, which are of both Kinds; or that I had never yet met with the Male, since in most Water Creatures, that live in the Water, the Females exceed the Males in Number, as for Example the *Haddock*. Now whether these Animals are to be call'd *Water Worms*, or *Fishes*, is of no great Moment in relation to the *Turbot*, since we have lately found the same thing, that is both Sexes in the distinct Coition of Land Insects, as Snails, &c. The smallness of the Body, neither adds, nor diminishes from the Truth of this System; for there are allow'd to be many Kinds of Water, Land and flying Creatures, which are like these in smallness, and Increase; and there are some Thousand
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‘ Creatures of various Forms, a Thousand times smaller than those found dayly swimming in Rain-water; but I desire you to Handle the foresaid Experiment seriously. I find also, as you was pleas’d to assist me, that the great Heaps of the foremention’d Particles like Eggs, plac’d up and down, wherein the *Fetus* of these Creatures are found, appear in Liquor wherein they swim, which is a dark obscure Bile; and that all of them, tho’ very small are of the same Figure and Clearness.

‘ THE Tail, or Hinder-part, tho’ it is like the whole Body, yet is smaller than any of the outward Parts, and is presently broke by any rude or rough Handling.

‘ THE only Places wherein I could find these little Animals, are the Vessels, Ducts and Receptacles of the Gall; but the greater Number of them breed in the Ducts of the *Gall-Bladder*, which Ducts appear in the station, wherein these Animals are found gathered in Heaps, out of Size, and with greater swellings, Circles, Windings and Cells; the Diameter of which Cavities is often above an Inch and an half; and these Nests are as hard as a Cartilage; by this Appearance I affirm many have been deceived, and have described these little Creatures as Worms extended in Length and Round; for tho’ they may be folded very closely, yet they expand themselves after Death, being put into a warm Hand, according to their Disposition, and likewise change their Colour and grow white Instantly.

‘ THESE Animals are found in the Liver; unless this Part is corrupted with Tumours and Ulcers. But whether these Animals are many in Number or few, or whether they are large or small, yet I never could find any of the Blood Vessels, out of their usual State, or the blood

changed

changed in them, much less these little Creatures in their Tubes or Bags; the Nerves preserving their Fabrick, in a due and regular Order; I observe that the Lymphaducts through the whole Body differ much, from their Disposition; for some exceeding the bounds of their due Expansion, are so closed together, that you can hardly see some exceeding the least tracing of them, upon which the Cavity of the Belly swells with the abundance of Lympha, the Interstices of the glandulous Bulk of the Liver is very much stuffed out, and every gland Turgid, and fill'd up even to the Eye with the Liquor; and also the external Membrane of the Liver is found harder and thicker. I am confident no Body will deny that these little Creatures do not lodge in the very Substance of the Liver, who will but consider on the other Hand, that they outwardly thrust into this Entrail, and through all the Coats of its Body, or through the Vessels of the Blood, Bile and Lympha, which no Body will go about to deny.

‘FIRST, The Arteries, by their Size, and Disposition are in the same manner thicker, and more firm, therefore freighter, about their Extremities stretch'd out in the Liver, and extended into very small Branches, so that they are likely to contain any of these Animals that are visible; at present I shall not bring Arguments that are contradictory from the Motion of the Blood and other Fluids, and from the Effects of the Causes, but from hence I gather, with *Redi* that 'tis not agreeable to Reason, that these Animals should be in the Arteries, and should increase. But I maintain, on the other Hand against him, with regard to the Authority of this learned Author, for I will not be byass'd, neither by Parties nor Persons, that they are in other blood

‘ Vef.

' Vessels. But if what this Author argues be true
 ' that they breed in the *Gall Bladder*, and make
 ' common Passage, by their gnawing and creeping
 ' and so fall into the blood Vessels, there should
 ' found somewhere Blood spilt and flowing, which
 ' I never yet met with. It is sufficiently evident
 ' from Experiments, and all likelihood, that the
 ' being here increased in Number, lastly perforate
 ' the Blood Vessels, by these Means creep into the
 ' glandulous Substance of the Liver, and hollow
 ' in little Cells, for the smallest Ducts of the Gall
 ' being taken up by these Creatures to the very
 ' End and Edges of the Liver, are so extended, and
 ' enlarged, that its glandulous Substance seems
 ' joyn'd to the outward Membrane, and firmly
 ' united, but yet there is nothing like Blood found
 ' in the Cells.

' FOR the most Part they break out in great
 ' tho' uncertain Numbers, and this is according
 ' to the greater or lesser time they have for Propaga-
 ' tion; from one Liver I took 870 whole Worms
 ' besides many that were broke and torn in the
 ' search; and from another Liver I have hardly
 ' got above Ten or Eleven. They are found in
 ' many Kinds of Beasts. I have been told by cer-
 ' tain Hunters that they have found these little
 ' Creatures in Stags, Boars and other greater and
 ' lesser Beasts. I have observ'd them often in the
 ' Livers of a Calf, and within these few Days of a
 ' young Bull, but of a dark green Colour; they
 ' are found in Sheep of both Sexes, and through
 ' all the Stages of Life, but rather in the old Sheep
 ' but this with many other things hath been lately
 ' discover'd to you. I have sometimes discover'd An-
 ' mals, in and about human Livers, of a different Form
 ' from these Creatures, and, as they, whether they
 ' were Worms or not, appear'd at that time to me
 ' to be Creatures of another Figure; tho' I dare

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perswade myself, that I have also seen them in an human Liver, (tho' indeed I had some more inward Knowledge of the aforesaid Animal, and had moreoever found how they might fold themselves together): But before I affirm any thing for a Certainty, I will neglect no Opportunity (desiring the same of you) to endeavour to publish, and make known the Truth of this Affair. See *Fab. 12.*

THUS far *Bidloo*, who denys that those Worms proceed from the *filth and Corruption*; but, that like all things living, *they rise from those which are like to them, and so form Eggs, or Seed*; which Eggs are conven'd in the Sheep, when in a Showry, Hot and Autumnal Season, *they lie upon the Ground and are lick'd up, and swallow'd by these Cattel, together with the Liquor wherein they swim.* Of this Opinion, we shall have Occasion to Treat, when we touch on the Original of other Worms hereafter. And this Author also denys that the blood Vessels of the Liver are taken up with those Worms, and affirms that *no one ever found them any where else, but in the Ducts and Receptacles of the Gall*, and that they are there nourish'd and grow, and are propagated; and Lastly, I shall explain in few Words, how Worms may be the Causes of Diseases, Symptoms and Death itself.



C H A P. VII.

Of the first Tænia of Platerus. That the Tænia is a rare Animal, but not a feign'd and Monstrous one. Which of the Tænia is more rare? Which of them was known to the ancient Greeks? The Trunk of the Body of the first Kind of Tænia describ'd.

WE come now to the first *Tænia* of *Platerus*, properly so call'd by many Authors. That there are two Sorts of *Tænia*, that are feign'd of the same Form, many credible Authors testify have been voided by many Men, in many Places, and at various Times. By the same Marks those Worms are distinguish'd from the *Monstrous* Worms, of which we shall Treat hereafter; for every one of these are said to be seen once by some one, in one Place, and yet they all differ, so that it still remains doubtful.

Sennertus thinks the *Tænia* of the second Kind of which I have spoke before to be the scarcer, or to be met less frequent, I say, that both of them are the more rare or common, according to the Places, or Countries in which either of them abound. In *Germany* and other Countries, I believe the second Kind is not so often found, when 'tis said by *Sennertus*, who was a *German*, to be the rarer. For my Part, I have practis'd Physick for these forty Years, never saw that *Tænia* voided by any one at *Geneva*, or in the Neighbouring Parts, till the time I was writing this Book, when I happen'd to see one voided by a Maiden, who was not indeed of *Geneva*, but born more from the West

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neither do I think 'tis often seen by any of our Physicians. But I, and they have many times seen the first *Tania* voided both by Men and Women, therefore it ought to be allow'd that this *Tania* is more frequent at least among our *Alpine* People than the other. *Gulielmus Fabricius*, who was both Physician and Surgeon, says, that they meet with it often on the Borders of *Switzerland*. So *Platerus*, and *Thadæus Dunus* write both of it, and saw it voided, the one at *Basil*, the other at *Zurick*. But that *Tania*, whereof *Spigelius* speaks, was voided by a *German* Woman at *Padua*, whose Sister voided also many other *Tenias*. This *Tania* is describ'd by many *German* and *Dutch* Physicians, that live in cold Climates, as we shall find hereafter, and few of them seem to speak of another.

HENCE on the other Hand I infer that the first Kind is more Rare in Hotter Countries, because the *Arabians* neglecting the Former, speak only of the Latter. To these I shall add *Petrus de Aviano*, *Shaddæus* the *Florentine*, *Job. Mich. Savonarola*, *Anton. Benivenius*, and other *Italians*, who have not mention'd the first Kind, but speak only of the other. And *Vallisnerius*, who is an *Italian*, and by whose curious Observations the second hath been discovered, never touches on the first. *Andry* describing his *Solium*, voided by a young Man in the Year 1698 at *Paris*, which Climate is colder than ours, relates that such Insects were voided by other sick Persons, by the Assistance of the Medicines he gave them; but owns that he did not see them disturbed in diseased Women. He adds, that *Monsieur Fagon*, the Kings Physician beheld this Kind of Worm three times; but it does plainly appear which Kind of broad Worm it was he saw. That, as it will; 'tis no wonder, that in a City, which has many thousands of Strangers, that, that

Tania of the second Sort should be seen, however Rare it is in the Northern Countries. We may say the same of this Kind seen at *London*, by *Tyson*.

We may gather from *Hartsoeker's* Letter to *Andry*, that the *Dutch* are very much troubled with the very same Kind; but he confounded both Kinds, or it appear'd so, because he says the Worm describ'd by *Tulpius*, was like to that of *Andry's*; since *Tulpius* touches only on the first of these Kinds. Indeed the Reader will see that that very long Worm, kept in the *Museum* of *Friderick Ruisch*, which he speaks of in the same Epistle, is placed under this Kind, not under the second. The *Tania* of the first Kind, is common with the *Dutch*, as on the contray, the second Kind is as Rare; so that as I have said, both Kinds are common and scarce according to their Climates. But again 'tis certain both Kinds are less common, than the round Worms; since few Children are free from them, and not one Man in Ten thousand are tormented with our *Tania*, whence 'tis, that many Physicians have never or but once seen either of these Kinds, and very few both.

BUT though both Kinds are very Rare, as to the Diversity of Place, yet in another Sense the *Tania* of the first Kind, of which we are now treating seems to be the less common. For what can be said to be more Rare, than that Worm which is equal in Length to *Indian Snakes* and *Whales*? The other Kind of *Tania*, of which I have discours'd was very long, but the length was precarious, I may call it, which hung by the uniting of many Worms together; whereas the *Tania* of the first Kind is one single Worm. This *Tania*, I say, is one Worm, and he who Maintains that it consists of many Worms joyn'd together, is as much Mistaken, as they who deny'd the Unity of the

other

other *Tania*, as the Reader will plainly see by and by. For what is more Rare than that Animal, from whose Body there can only be some Pieces had, and which is very seldom seen whole, since 'tis usually voided by piece Meals? Many have seen scraps, and pieces of the Body of this Insect, and those very long, but few or none have seen it whole and entire. From hence arises the Difficulty to know it thoroughly, with which I shall not be so terrify'd, as to go back and dissent from my promised Description; but shall lay down, from the Writings of the several Authors, who have treated of this our *Tania*, what may be depended on for Matter of Fact, and also add some few things from my own Observation, lest I seem to depart from my Representations. And first I prefer and make use of the Testimony of those Authors, who describe, or say they have seen the Trunk of that Worm's Body, and in like manner of those Authors, as I shall afterwards come to them, who have seen its Tail or Head, whose Number will not be very great.

Of these, *Platerus* is the first, whom I have already observ'd among the chief that describe, and distinguish this *Tania* from the other; next is *Arnaldus Villanovanus*, who hath already Treated of the broad and long Worm, separate from the Gourd Worms, but hath not described that Worm; neither have the ancient *Greeks*, as 'twas likely, described; nor decypher'd their broad Worm, so as it might plainly appear, which was *Arnaldus's* broad long Worm, and which was the *Greeks*, of which hereafter. *Platerus* describes two, and even three Kinds of *Tania*, the first and the third of which are distinct from the Link of Gourd Worms; and first, of the first Sort he speaks in these Words, in his Book of the *Animalium Excretionem*; There are such Bodies, says, *Platerus*, of diverse Kinds voided, tho' but sel-

dom, at the Anus. One of which Resembles a Piece of Tape, Membraneous, and like the Substance of the small Guts, of an equal length with them, but not hollow like them, and of the breadth as a Finger, which is call'd a broad Worm, but more properly a *Tænia* of the Guts, but hath not the likeness of a Worm; neither does it live like one, or move; but when it comes away, either whole, or broke, it causes so great a Pain in the Patient, that he thinks all his Bowels are coming away. In which Tape, there appear black Lines a cross, through the whole length of a Fingers breadth, from each other, rising in those Intervals like the Vertebra.

THE same Platerus, explains to us the difference between this kind of *Tænia*, or broad Worm, and the second, in the following Words, by which the other *Tænia*, or Chain of Gourd Worms, is describ'd. It seems, says he, there is a very long *Tænia* form'd quite otherwise, viz. of many Parts cleaving together which may be pluck'd asunder, which Parts, as they are something like the Gourd Seed, are call'd the Gourd Worm; which are seldom voided whole, but generally divided into many Pieces, which are thought to be single Worms, call'd Gourd Worms, though they are only broken Pieces of that Tape.

FROM hence this Author passes to the description of a certain third Kind of *Tænia*; And there is another Kind of *Tænia* correspondent to the former, not quite so broad, but round, like other Worms, and like it in all its Composure, which we may call a Tape Worm; it is also Motionless, seldom voided by Men, but often by Dogs; sometimes whole, and sometimes broke; and frequently when 'tis small, cleaving to the Podex, that it will come from thence without being drawn. Of this Kind of *Tænia*, which molest Dogs we shall take Notice hereafter. I shall not stay to insist on what Platerus hath Writ of some other

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Kinds of Worms neglected by the old Physicians, but shall Treat of them in few Words hereafter.

THE first Kind of *Platerus's Tania* was at the same time, or a little before taken Notice of by *Thaddæus Dunus*, as we may infer from his own Words, a *Minister's Wife* in Switzerland, who was a young Child bearing Woman, and had labour'd under a broad Worm, about three Tears; she sent me a Piece of that Monstrous Worm, (which was very acceptably receiv'd by me, since I had never seen any before) that I might see it, and think of something to remove this Evil. This Piece was at least five Ells long, had neither an Head, or a Tail, was altogether like its Worm, and was Slimy like a Snake, unless it may more properly be said to be Knotty, 'twas of the the breadth of ones little Finger, and of an ash Colour. In the Year 1571, in which he dyed, she voided one of an incredible Length, viz. above seventy Ells long, &c.

Casparus Volsius, a Cotemporary of this Authors, seems to describe the same Kind of *Tania*, treating of the broad Worm, voided by a sucking Child, and call'd by him a *Gourd Worm*, which was three Ells, and ten Inches long, white, and Mark'd with some Knots and black Spots.

OF the same Nature, was that *Tania*, which *Carolus Clusius* saw, Oblong, white and curled, like a narrow Girdle.

BUT since those Authors only tell us the form of our *Tania*, and *Platerus* himself, who seems the first that distinguishes this from the other, is very brief, and was Mistaken when he denies that his *Tania* lives and moves, as we shall hereafter see, we must consult some other Authors, and first *Spigelius*, who hath set forth those things more at large. But before he describes our *Tania*, let us first observe that when he Treats of the broad Worm, he admits of the two Kinds, indicated by *Platerus*, but in such a manner

that he takes the second Sort for one single Worm. That which hath some likeness to a Tape, says he, in the 6th Chapter of his Book of the broad Worm, ought not to be taken for the broad Worm of the antient Greeks, though it may seem sometimes to be of the same Length, but for a Worm of its own singular Species, which the Arabians, from its Figure of Joints, would call the Gourd Worm, &c. I, says the same Author, shall rather Name it a Tape Worm, or Bastard Tænia. But I ingeniously confess, I don't find the antient Greeks make any mention of it, &c. But these Words of this Author are very little to the Purpose, for we are not certain which of the Kinds decypher'd by *Platerus* and *Spigelius*, was known to the antient Greeks, since the Antients have described neither of them nicely. But these Words of *Hippocrates*, whoever hath a broad Worm, voids as it were, Gourd Seed, seem to shew that he Treated of the Latter, since they who are troubled with the Former, do not excern any thing like Gourd Seed. *Spigelius* owns that he never observed in the Excrements of that Woman, who voided the Tænia he describes, i. e. the first Kind, any thing like Gourd, or Cucumber Seed, but that he always took Notice of a Worm; now because he found it did not answer to the Observations of *Hippocrates*, and other Physicians, endeavours, as we shall see, to wrest his Words to another Sense. Now if we consult other Authors more modern than *Spigelius*, who take Notice of this Kind of Tænia, as *Fabricius*, *Hildanus*, *Horstius* in his 11th Book of Observations, and with him *Stromaierus*, *Eckoldt*, *Jung*, *Widemannus*, we shall find none of them speaking of those Gourd Seeds voided with this Tænia; except *Stromaierus*, who says there was something like a Gourd Worm voided with the Tænia, which he saw, but that 'twas nothing but a Piece of the same Tænia, we may gather from this Authors own Words. Tet, says *Stromaierus*, the

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sick Woman neglected in my absence, to observe whether afterwards there were many Pieces of that Worm voided, because there did not appear in that long Piece, either a Beginning or an Ending, though a little Piece like the Gourd Worm, which Spigelius describes from Cornelius Gemma, was voided with it, which whether it had stuck to the Body of that Worm, and was drawn from the Head or the Tail, I cannot tell. Thus Stromaierus speaks doubtfully, and it seems from the Womans Relation. But the *Tania*, which he saw, he owns, was very like the *Tania* of Spigelius, and by its Commotion, shew'd the last Signs of Life.

NEITHER does what Spigelius, adds of the *Tania* of the second Sort, or of the unlikeness of Chain of Gourd Worms, and the Tape Worm any ways move me, since on the contrary this Chain, is not only as long, but is also as broad, or flat as a Tape made of Thread, or Silk. The only Difference, at the first Sight, between the Form of these two living *Tania* is, that the outward Edgings of the first Kind are drawn in a straight Line, the second in a spiral or bending one. Whatever the Difference may be, it does not seem of so great Moment as to hinder both, or either of the Animal *Tania*, from being compar'd by the Antients with Linnen or Silken Tape, from which they receiv'd their Name, since the Edges of the Silken and Linnen Tape of the Antients might vary as much as ours. But first Spigelius's Conclusion is very absurd, where he says, he was sometime of Opinion, that the Tape Worm, or *Tania* of the first Kind rowl'd itself up in the Belly, like such a Worm, as he describ'd from Cornelius Gemma. That Worm of Cornelius Gemma's was nothing but a Link of Gourd Worms, of which I have spoke, but whose Figure was not very accurate; therefore Spigelius might not know that it was like a Piece of Tape, this then was not Gemma's Fault,

but the Drawer or Ingravers, but it could not be Mended by *Spigilius*, who had never seen this Worm.

BUT before *Spigilius*, there's *Aldrovandus*, who Writ that the *Tania* of the ancient *Greeks* differ'd very much from the *Gourd Worms* joyn'd together. Many of our Modern Physicians, says *Aldrovandus*, in his 6th Book of Insects, Chap. 2. Confound the *Tania* of the Ancients with the *Gourd Worm*; yet they do not agree, in my Opinion, though 'tis certain that the *Gourd Worm* was not known to the antient *Greeks* and *Latins*, and that the broad Worm or *Tania*, was known to all. They differ, because the *Gourd Worm* when long, seems to consist of many Worms, like *Gourd Seeds* united closely to one another in the long Train, in which it appears; the broad Worm is only one single Worm of an equal Body, which extends itself sometimes in a great breadth. I have taken care in the first Place, to delineate in this Table, which I set forth the Figure of a *Gourd Worm*, as *Gemma Frisius* observ'd it, which was Twelve or Thirteen Foot long, &c. Now there are the same Reasons against *Aldrovandus's* Opinion, as that of *Spigilius*. But we must here take Notice that *Aldrovandus* does not agree with *Spigilius*, as to the Junction and Uniting of the *Gourd Worm*, set forth by *Gemma*, though he did ver-ry well know the *Gourd Worms*; neither, may be, had he ever seen them; otherwise he had taken care to have had the Plate of the Chain form'd by those Worms, drawn more correct. Neither is his Plate of the *Tania* of the first much better; whence we may Conjecture, that that Worm was not better known by him than the *Gourd Worms*, See Tab. 6. Fig. 1. But from what I have said against the Opinions of *Spigilius* and *Aldrovandus*, it does not follow, that I deny that our *Tania* of the first Kind of *Hippocrates* was known to the other *Greeks*, though

ough it may be inferr'd from what has been said, that as it is more Rare in the hotter Countries of Greece, so it is less known. The Antients might have seen both Kinds, but they speak only of one, which if we credit *Hippocrates* and other Greek Authors, seems to be the Latter; as the *Arabians*, and their Followers point out only one, which is said by none to differ from the *Tania* of the second Kind, the Link of *Gourd Worms*. But some will perhaps object that the *Tania* of the *Greeks*, ought to be distinguish'd from the broad *Worm* of the *Arabians*, because the *Greeks* affirm that their *Tania* is the long and entire Body, the *Arabians* say, that their broad *Worm* is short, and that they never saw long, unless many of these are united and joyn'd together in a Chain. But 'tis easie to answer for the Mistake of these Modern Authors, which I have spoken of; and the *Greeks* might be very well led into the same, being deceiv'd by that Union, and Junction. If learned and ingenious Men who live at this Time, so great an Insight into the Natural History should be in the Wrong; I don't see why the *Greeks*, who were ignorant of it, in respect of this, might not also be Mistaken? Besides, I am willing with *Spigelius*, to call this second Kind a curious and Bastard *Tania*, but not with him for its likeness to a Linnen, or Silken-Tape or to the perfect *Tania*, known to the antient *Greeks*; but for this Reason that the *Tania* of the second Sort is not the Body or Animal, but is compos'd of many, which may be separated. But the other *Tania* describ'd first by *Platerus*, for one single and entire body, like a Piece of Tape or Line, is call'd by the *Tania*, as the first and genuine *Tania*.

RESTING here, let us see that *Tania* describ'd by *Spigelius*. What the Antients, says he, have said of the figure of this Animal, call'd *Tania*, which Name they have

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have very well adapted to it; since it is so very like the Linnen Bandages and Rowlers, in which they commonly wrap their Children in most Countries of Europe, that I think they could not have given it a more proper Name, &c.

I will not here transcribe Saracenus's Answer to Fabricius, lest I be more prolix, tho' in that Answer, he speaks of a *Tania* which he saw, but does not describe it. But from the same Answer, I shall pick out something, and also from three or four other Relations of Fabricius on this Argument, where I come to treat of the Signs that indicate that Infection.

THERE are five such Accounts to be found, in Horstius's second Book of Observations, written by himself, Sebastianus Stromaierus, Eckoldt, Jung, and Widemannus, but in all of them, there is no Description of the *Tania*, because those Authors as they themselves say, took Spigelius and Fabricius's Description for a very true and exact one. Only Eckoldt says it was white, and speaks of a Worm upwards of three Yards long; like the Laces wherewith Women Lace their Stays, but something broader and snagged, like a Saw on the Top. This Worm had Intervals of the breadth of an Inch, and in some Places more, a little elevated and rais'd, much like that describ'd by Fabricius: I wonder that Eckoldt should say that the Worm describ'd by him, was like that of Fabricius's, when the Intervals of this, were hardly half a Fingers breadth, and those of Eckoldt's were above an Inch; either his Description is not exact, or his *Tania* is different from Fabricius's. Now I doubt whether there are any *Tania* of the first Sort, whose Interstices or Joynts are an Inch distant, for I never saw any, or read of any who did, except Platerus, who seems to say something like what Spigelius observes that of the two Pieces which he saw, the one had greater and thicker Knots, and fewer Indents and Incisures; but does not

not say that the Interstices were an Inch between. May be *Eckoldt* did not see the true *Tania*, but the *Staffard* or *Chain* of *Gourd Worms*, whose Interstices are an Inch.

THERE is also a Description of the former *Tania*, by *Andry*, who hath lately Treated of all kinds of Worms, but, as 'tis shorter 'tis not so very well done. What he has pass'd over, we cannot expect from other Physicians, who treating of others, mention Worms by the by, though our *Tania* has been seen often by many of them, who might easily have describ'd it; for it is Customary with your old Physicians, who have great Business, and therefore the greater Opportunities of making Observations, to mind so much the visiting of their sick Patients, that they neglect to set down whatever is worth Observation: And those who are younger and have time, and would write, want all those Medicinal Observations of Note, so useful to all who do Write, as well as those who read what is Written.

Now, lest I may be said to keep to myself those things, which have been observ'd many Years before me, it will not be a miss to lay down what I have Noted; since I have often seen the genuine *Tania* or Pieces of this *Tania*, voided by both, at all Ages, which were like those Cuts publish'd by *Spigelius* and *Fabricius*. The first of these Cuts is the most exact and nice engrav'd by a better Hand, expressing the *Tania* newly voided; the latter, which is Cut indifferently in Wood, and very False, expresses this Worm dry, and kept some time after the Excretion. See *Tab. 5* and *6*, which are the Cuts of *Spigelius* and *Fabricius*. Also *Spigelius's* Description of the same Worm, contains many things worth Notice, which are wanting in the shorter one of *Fabricius*: And moreover, I shall explain

plain them both, and confer some things omitted by these and other Authors.

ALL Authors allow of *Mucous* or *Polypous* Concretions, which Resemble Worms, or other Creatures, but what's that to do to the wonderful Texture of the *Tania*, and the stupendious Work of Nature in framing it; since there is no Insect or Creature of a more exquisite Form. Surely the make of it alone is sufficient for us to understand how much *Platerus*, and those other Authors, who deny the *Tania* to be an Animal, but on this only I shall not insist. Though we own we have often Peices broke off and disjointed from the whole that when voided are dead and motionless; but from thence it does not follow that the whole *Tania*, does not live, and move when in the Body. But those Pieces are not always, when broke off dead, but have a manifest Motion, as 'tis observ'd by *Spigelius*, who saw a *Tania* so active as he says in the fifteenth Chapter of the *broad Worm*, being thrown on a Stone, it gathered itself into Circles, and when put into Water, form'd itself into a Ring. I have also seen the *Tania* in a gentle Motion; but we may seem to ascribe the slower or quicker Motion of these Pieces of the *Tania* to the mildness or strength of the Medicines that expel them, as we have observ'd the *round Worms* to be voided sometimes lively and brisk, and sometimes half dead, and sometimes quite dead.

YOU may compare our *Tania*, with *Spigelius* to a swathing Band, such as they wrap Children in; but since 'tis not altogether in breadth like it, 'twould be more proper to compare it to *Tape*, from whence it derives its Name. But why this Infection is call'd so every Body knows, who hath seen newly voided, for at first Sight 'tis very like Linen or Silk-Tape.

THA

THAT this Insect *Tania* is white, both *Spigelius* and *Fabricius* say, yet they differ, because the one affirms that 'tis altogether white, and the other that is white mix'd with black Spots between the Interstices, which *Volsius* confirms. *Spigelius* describes it in the State wherein 'twas just voided; and the other two did not see it, till 'twas dry'd, or some Days after its Excretion; for those Spots do not come so soon, unless the Piece when broke from the rest of the Body, had lain sometime in the Guts, of which we shall speak in a proper Place.

Spigelius says, that in the upper part towards the Head 'tis the breadth of a little Finger; *Fabricius* says six grains (which is as I take it six Straws breadth) which is much the same thing. Now this is rather too great a breadth; but as the *Tania* are of different Sizes, so they are of several Breadths; for I shall show there are greater or smaller *Tania*, but in that *Spigelius* and *Fabricius* seem to disagree, because the one says, that the *Tania* from the upper part of the Body grows smaller towards the Tail, and the other, that 'tis almost all of a breadth, but only in one Place, which Ends in a slender fine Thread. The Reason of this Difference proceeds from the various Lengths of the Pieces they saw; for when 'tis long, and is the upper part, we observe it to be almost of the same breadth, till by an immense Interval of Feet we come, as I may call it, towards the End, where it sensibly grows smaller; as we may see by long Snakes. Therefore as *Spigelius*'s Piece was half as short as *Fabricius*'s, and part of the Tail belong'd to both, the upper part of *Spigelius*'s ought to be nigher the Tail, than that of *Fabricius*'s; wherefore 'tis not strange, if by degrees it grew smaller towards the Tail; but *Fabricius*'s being longer by the upper part, and by Consequence more remote from

from the Tail, did not so sensibly turn narrow, but seem'd to continue its breadth for a vast space.

Fabricius says his was two Grains or Straws thick when 'twas hardly one. *Spigelinus* more properly says, his was the thickness of the *dura Mater*, that his was almost a transparent Body, and the Length we shall see in the following Chapter.

THE Substance of the *Tania* is soft and smooth and very straight, or brittle, wherefore 'tis Rare to have a whole one. Besides we must observe, that that Worm is never voided with its Head or Tail first, but when ever excern'd, hangs out at the *Anus* by the Middle doubled; for which Reason, how gently soever you draw 'twill hardly escape breaking; for the Head and Tail being buried in the Guts always remain with some part of the Body.

Fabricius makes this Observation, that that Worm hath between the Interstices the breadth of two Grains, on one Side something raised and Saw like; hence he says, that if stroked from the upper Part of A, to the hinder part B. 'Tis smooth, and from the contrary End rough; 'tis all white, but between the Interstices, set with black Spots.

Spigelinus describes those Interstices in these Words, ' I have seen our *Tania* like other Insects, with ' some Lines or Incisions transferr'd in equal distances (which Lines are call'd by some Circles, ' because by these, this Worm contracts itself by ' many Folds into Rings, or Circles) in the Space ' between which it hath some *Internodes* like Pimples ' which are by some named *Gourd Worms*, because ' they seem to Resemble the Gourd Seed, when ' broke and single. *Thaddaus Dunus* call'd them ' Scales and more properly Joynts, from the likeness ' of Knots and Joynts in the Stalks of Plants. When ' these are full of Aliment they are sometimes of

brown Colour, and have black Spots, but when empty they are quite white; when lifted and raised up, they appear like two Skins between which the Aliment is contain'd, to Nourish all that Part of the Worm that lies between the Incisions or Lines. Neither is this Worm thicker in any Part, than in these Nodes, and yet they are no thicker than the *dura Mater*. These when nigh the Tail, the nigher they are, the smaller they grow, till they are quite lost; whereupon the Intervals of the Incisions become less and disappear.

THUS he confounds the *Internodes* of that Worm with the *Gourd Worms*; but first we must take Notice that he thought his *Tania* to be the same with the *Tania* of the *Greeks*, since he had read *Hippocrates*, and other old *Greek* Authors, that they were troubled with the *Tania excern'd something like Gourd Seed*; for he owns in his 15th Chapter, that he could not find in the Dung of his Patients anything like Gourd Seed, but thinking to supply the Defects of his Sight by his Imagination, to persuade the World that he saw the same things as the Patients, he endeavours, to explain this Place of *Hippocrates* thus; 'When the Author of the 4th Book of *Diseases*, and other antient Writers, says *Spigelius*, write that they who have a *Tania*, excern with their Excrements, the Cucumber Seed, they do not mean the Cucumber Seed, but that a Piece of the Worm comes away sometimes with the Excrement, in the middle of which Piece there are some Joynts inclos'd in a broad Skin, or Membrane, which when single or many together, may be compared to one Seed or many Seeds of a Cucumber, cut a long or a cross; for their Form and Disposition is alike'. And lest any one should doubt of the Pieces the *Tania's* being the Cucumber Seed, our Author

thor tries to explain in these Words, how they assume this Form; for says he, 'What is expell'd like
 ' Cucumber Seed, is not the Off-spring of the Worm
 ' but little Pieces broke off from it, for that Part of
 ' the Worm, which is thinnest at the Sides, remain
 ' ing in the Body, either dead or half dead, easily
 ' Putrifies; but that which is in the Middle like
 ' Knot or Ball, being preserved by the membranes
 ' Coat or Sides, (as he calls them) are thicker and live
 ' lier, in the form of the Cucumber Seed; and, after
 ' 'tis broke from the Worm, is preserv'd a longer
 ' time, remaining even after 'tis expell'd the Body
 ' ly whole, and entire in its own form'. Thus Spigelius is turning and winding to show the likeness of the Pieces of the *Tania*, and the Cucumber Seed, which Streights and Difficulties, he had evaded if he had ever seen the true *Gourd Worm*.

BUT let us lay aside this Opinion of Spigelius and the *Gourd Worms*, to return to those *Lines* or *Incisions* of the *Tania*, and the *Intervals*, or *Interstices*, or *Intermediate Nodes* of those *Incisions*, and to the *Scales*, *Pimples* and *Spots*, of which Spigelius and Fabricius speak, and search into, and explain all these things as distinctly as may be.

THE whole Body of the *Tania* appears to all Beholders nick'd with *transverse Lines*. These Lines are about two or three Geometrical Lines distant from one another, at least in the upper Parts of the Body nigher the Head, and that Insect is twice or thrice as broad; from thence proceed the Interstices of a quadrated Form, longer than those single Lines which Interstices terminate on each Side of the Worm. But when I say straight Lines, I mean most of them, except some few irregular ones, whose Obliquity doth not render the Interstices of an exact Square. See *Tab. 8. Fig. 5*. Secondly, we must observe, that those Interstices are like so many Covering

coverings or thin Plates, disposed like Scales, so the under or hindermost seem to be inserted into the upper or foremost ones; though no gaping or aperture appears, where the under Plate lies under the upper; whence we may make this Remark, that the Cuts of *Fabricius* and *Tulpius* were False, where that situation of the Plates is inverted. Therefore *Thaddæus Dunus* calls it the *scaly* Worm from the formation and disposition of the Plates; and the *joynted* Worm, because he compares what we call'd Lines to the Joynts or Knots in the stalks of Plants; whence *Spigelius's* Interstices are call'd internodes, or intermediate Knots. He also gave the Name of Incisions to those Lines, because when those Lines are form'd from the Limbus or Border, or from the lower Border of any of the Plates; and this Border is higher than that of the next Plate, that goes under it, there appears an Excision (in French *une Caitaillure*) the one Border being pressed down, and the other raised. Hence according to *Fabricius's* Observation, if you stroke the Upper part towards the lower, 'tis smooth like an Eel, at the contrary way 'tis Rough.

BESIDES, we must observe that the same Lines are stretch'd out, with a little Point, on each side of the *Tania*, so that the Sides of every Plate are in a straight Line, and for the shortness of the Plates, or Interstices, and the nearest of the lines on the out Side of the Insects Body, its sides appear *snagged, hairy and jagged, with little Pricks*. These Pricks are very easily distinguish'd from the Cuts of *Spigelius* and *Fabricius*; in that *Fabricius's* they are longer and sharper, because the *Tania* was dry'd; and in the others they

are drawn shorter that *Tania* being fresher and moister.

Spigelius saw the Sides crook'd and gather'd close together, so that that Worm then look'd Round. Also the *Tania* mention'd by *Clusius*, in this Chapter, was Round; which thing I never took Notice of, because the *Tania* which I have hitherto seen, were most dead ones, and the others which were alive could not well contract or bend their Sides, nor move any otherwise than when stretch'd out on the Ground bend themselves sometimes, and rise two or three Lines high.

THE N we may Remark that the cross Line, in that Worm, however dry it may be, is not defac'd or chang'd, but remains whole and entire, which is otherwise in some of the other Parts, as will be seen hereafter. Also the Sides describ'd with jagg'd and snagg'd Lines, as we just now observ'd, remain'd whole and entire. The Position of all these Lines, which by their smallness seem to be many muscular Fibres, or Collections of Fibres, indicate their Use; so that when the cross Lines are relax'd, the Body should be flat, and when contracted bent, and as if Round; and likewise as the long ones are relax'd or contracted, the Worm is either stretch'd out or drawn in; in which Use also the smaller Fibres, of which the whole Skin or Membrane covering the inward Body consists, may contribute. And 'tis very probable, that when the under Plates seem to bend under the upper, our Worm may sometimes by contracting its Fibres or side Lines bend or roll itself in the Form of a Ball.

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BUT those smaller Prominences, which in some measure Resemble Pricks and Thorns in this Insect when dry, may perhaps, be so many Feet, by which that Worm when bent may the more easily creep on the Guts, or stick the closer or faster to them. For that it becomes bent, will seem very likely, according to *Spigelius*, if we understand that this Worm, cannot in its flat form perform its progressive Motion when it creeps within the Guts. Who can be so silly as not to think that these lateral Prominences were not instead of Feet, if he considers that they were only in the Trunk, and not in the Tail, and end of the Tail, according to my Observation, and that of *Spigelius*. This was my Conjecture before I had seen *Tyson's* Dissertation on the broad Worm; for in that Dissertation there is contain'd a Description of a *Tania* found in the Guts of a Dog, whereby both the Testimony of *Spigelius*, concerning the bending of the Sides of our *Tania*, and the Uses assign'd by me to their Prominences are confirm'd; and what has been here said of the *Tania* in Dogs, may be said of those Men, if they are of the same Kind.

THUS much for the cross Lines of the *Tania* and the Plates contain'd between them, and each of their Borders; and now let us consider the part in the Middle of those Plates. *Tyson* says, that in a kind of broad Worms taken out of a Dog, which seem'd to have as much Affinity to the *Tania* Species as any other, he discern'd in the Middle in a flat Part, some Orifices or Openings like, Analogous to those in the Hem or Border of the Gourd Worms. (See Chap. the 4th above) but I never saw such a thing in our *Tania*. And *Fabricius*

affirms that in the middle Part, it hath a small Cavity. Likewise Spigelius says, he found the same Cavity in the intermediate Knots or Nodes, which Nodes, when full of Aliment are sometimes of a brown Colour, and have black Spots, but when Empty, are quite white; and when lifted and rais'd up, appear like two Skins, between which the Aliment, wherewith the Worm is Nourish'd, is contain'd. We may here gather from the following Words of Spigelius, that the Oval Bags, such as they appear in his Cut were design'd for the conveying of the Aliment. The Make and Formation of those Bags or Pimples or Spots seems to be Oval or Round, if you look on the *Tænia* afar off, and especially lying in Water, but if you examine it nigh, it appears of a different Form. In the Middle of the Body of the Worm, says Andry, there is observ'd to be a Duct made like a Chain, and reaches from one End to another. This Duct appears very plain, just after the Worm is voided, but if it hath been external any long time, then 'tis not so plain to be seen unless you hold the Body of the Worm against the Light; thus much Andry; but there is another thing observ'd by Borrichius and Heyde. 'The Duct doth not run in the Middle of the Back, say Borrichius, a Swathe, as Sennertus delineates it, separated with contiguous Knots, but in the Middle of every Incision, some little Points or Spots appear, sometimes three, according to Tulpian and sometimes more, form'd into six Angles which are full of a thick Liquor, the first Day white as Milk, but afterwards it changes to a Colour like Blood. But this Author tells us, that in another *Tænia* he did not perceive any of the Spots as in the former. But Heyde comes closer to the Point. 'The Duct C, creeps along the Sub-

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stance of this Body, and divides itself into the many lateral Branches, D, with which the whole Body is encompass'd. These Ducts appear to be hollow, by the white Matter they contain, which upon pressing them is forc'd out: whereby 'tis plain all the lateral Branches have a Communication with that middle Duct, tho' many of those Branches are thicker than it. See *Tab. 6. Fig. 3*. But those Branches do not differ from *Borrichius's* Lines, or the other six Angular Spots or Points; for all these seem to be nothing else, but the Milky Vessels, which when they were full, appear'd to *Borrichius* like so many Lines or Strokes, but when they began to empty partly disappear like Spots.

NEITHER did those Vessels appear to me under any other Form, than like Branches or strokes very much Resembling them, whereof some were smaller, and others larger, some Straight and others Oblique and Crook'd, that they represented a Shrub wood; in short, they did not differ much from the Milky Vessels of the *Gourd* Worms, describ'd by *Vallisnerius* as to their Make and Disposition, only they were larger and thicker. See *Tab. 7. Fig. 1, 2*. Which Figures were delineated by my Son, Dr. *James Clerk*. *Weyde* observes that many of those Branches were thicker than the Trunk, which thing I myself have taken Notice of; I have seen that Trunk very small, when the Alimentary Duct, or Gut of the Worm appears, because by emptying itself into the next Branches, and Milky Vessels that hang to it, it grows smaller, and doth not show its whole Extent. But that Author, if we regard his Cut, saw that Worm partly without its

Skin, or at least move its Incisions or Joynts, so that the subjacent Branches were more plainly Evident, which I think was a very difficult thing.

BUT as to those Branches; we just now observed that they were easily to be seen, of a Milky Colour, in this Insect, when newly voided; but that they sensibly disappear, so that they are no longer like Branches or Lines; but like white Spots, which at length entirely vanish. Yet the middle Line or Trunk remains, from which all the rest proceed, and which at first is *white*, but afterwards becomes *livid*, or according to *Borriacchini* of a *bloody* Colour, till by the length of time 'tis *black*, which may be imputed to the Stagnation of the thicker Juices remaining in that Trunk by which they change their Colour, and from this Change of Colour arise those Spots observed by Authors to be like *Pimples*. Neither is this all for when the Worm is quite dry, that Trunk does not appear smooth as before; but instead of Spots there jut out some black, rough, thick *Nodes* or *Knots*, separated from one to another. Likewise when the other Parts of the Body, which we have already described, and which are changed from *yellow* to a *red* Colour, by their dryness become small, then those *Nodes*, form'd from the hardened Relicts of the Aliments, and which, when the Insect is newly voided, are hardly visible, become rough and thick to the touch of the Fingers. These Mark the middle of the *Tania's* Body according to its Length, with a Line or Stroke, described with black Spots, but the form is not the same in all of them, in some of the Plates there are many, in others but a few, and in some which is Rare, none at all: But when the cro

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Lines, or Fibres already describ'd, appear low and small, before that long knotted Line, the one is instead of the Vertebra, or back Bone, and the other the Ribs; so that this Insect in this disposition Resembles at the first Sight a Viper that has cast his Skin, and is without an Head. Yet we must observe, that those cross Lines touch and fall on the middle Line, in that Part where every Node is included between two Strokes, neither does any of the Lines, cross in the middle of the Knots. See *Tab. 7. Fig. 3.* But I think it does not follow from hence that the Canal or Duct of Aliment is any way intercepted by those Lines, when the Canal, or Duct may easily go under the Lines, and creep between the Membranes, which are in the stead of a Skin to this Insect; tho' the thicker Lines may in some Measure hinder the Duct from being seen; whence 'tis that no Knots are seen under them. I never once took Notice of those Nodes in the dry'd Pieces of the *Tenia*, and I find the same observed by *Heyde*. I think, says this Author, 'tis Remarkable, that a very large Piece of this Worm, being laid on a blew Stone, and exposed to the Air, for a Day or two in a Chamber, should all be consumed, except only the Ducts, or rather the Matter which they contained. Now this Author says that the Matter he inspected was white; but that which I saw was always black; but the remaining and harden'd Humour, of both Colours, seems to show that the Alimentary Duct is situated here, neither did I see that the other Parts, except the Duct, were consum'd, for the cross Lines were left, and so were the Plates, though very much lessen'd. I have not been able to discern hitherto very curiously the Form of its Tube, or Duct when just voided, though I believe it is

broader than it seems, for this Reason, because the Knots which appear in it when dry, are sometimes thicker than the Tube itself when newly Excern'd. 'Tis easy to know how difficult it is to perform an accurate Dissection on that Insect, if we consider first, That 'tis very Rare; secondly, That 'tis Excern'd in many Pieces, and oftentimes dead, or half putrify'd by the remaining a long time in the Guts after 'tis dead; thirdly, tho' it is sometimes Excern'd alive, yet before it is brought to the Physician, some Parts of it may be chang'd, so that he cannot make, or what is more, go on with any Anatomical Experiments on it. I have said here, that I have seen this Worm often; and within these forty Years, above twenty times, which was often enough to have made many Experiments on it, but I never thought of them till lately, when I came to Write of this Worm; and I know not by what Chance, but ever since I have had several Pieces of that Worm brought home to me, but in such a Condition that I could not discover all their Parts, especially the Alimentary Duct, of which we now Dispute. But since I have had better Fortune with them to see both the Head and the Tail, of which I am about to Treat.

BESIDES we ought not to doubt, but that our *Tania* hath other Vessels, besides the Alimentary Duct, which contain a Blood, or Liquor Analogous to it. But 'tis a Work of so much difficulty to find out and discern them curiously, as is only fit for such accurate Naturalists, as *Malpighius*, *Rhedi* and *Vallisnerius*, by whose Industry, it may be done. As for me, who follow only those things that are plain and obvious, I have not much to say on those Vessels; only I observe Threads that

parallel, through the Length, with the middle Line, and which surround it on each Side, being of an equal Distance from the Line, and each of the Sides or Borders. Neither are these Threads, which are sometimes double, mention'd by *Spigelius*, or any other Author that I know of, to be seen, unless by very piercing Eyes, or by holding the Worm against the Light. See *Tab. 7. Fig. 2.* They either are Shadows or real Vessels, for when they are held against a Candle, they seem black to the rest of the Body, now that Shadow could come only from a Liquor that fills those Vessels, for otherwise, these Threads wou'd be as clear as the rest of the Body, and could not be discern'd. Besides there are other Vessels, that fall perpendicularly into these, or proceed from them, and which supply all the other Parts of the Worm with the Alimentary Juice, and no Body can doubt but that these are too small to be seen, and without dispute there are Windpipes, wherewith this Worm breaths and other Viscera, which may perhaps be sometimes discover'd by the Industry of some curious Persons. It is sufficient for me at present if I can Contribute any thing towards these Discoveries, whereby the Nature of that Insect may be something better Understood.



C H A P. VIII.

*The Description of the Tail and Length of the
Tænia.*

NOW I come to the Description of the Tail; that Part or Piece of the Worm which *Spigelius* saw, he asserts was five Cubits, or two Yards and a half long, and that it was the End of the Worm; or part of the Tail, of which there was wanting, in his Opinion about a Foot or two; and we may conclude from *Fabricius*, that Piece he saw, was much such another, when he says the Worm was at one End like a Thread. But why should not he have described this Thread in more Words, and given Cut of it? For the End of his Cut of this Insect is not very small, but Ends thicker than the of *Spigelius*'s, which is about the breadth of three Lines. See *Tab. 6. Fig. 2.*

THEREFORE lest the same Neglect be imputed to me, I will give you as accurate a Description and Delineation of a whole Tail of this Worm which I saw, as possibly I can. About twenty Years ago, a Man of about fifty five, of a robust Constitution something Fat and Purfy, and of a Sanguine Complexion, complain'd to me of an Acute Pain, and a sort of Gnawing in the epigastric Region, or Upper part of the Belly; to remove which Effect, thinking it was some sharp Humour, I prescrib'd a gentle Purge of an Infusion of Senna and Rhubarb, with Syrup of Marsh-mallows. Upon taking it, after some Stools, he perceived the *Tænia* hanging out at his Anus, a Piece of which

He voided Eight or Nine Foot long, without a Head or Tail, upon which all the Symptoms ceased. A few Days afterwards I thought of some Medicines to expel this troublesome Guest, and cleanse away its remains, but they had no Effect, and the Man seem'd to be very well. In about a Years time, the same Pain and Gnawing return'd, I gave the former Medicine, and he voided another, almost of the same Length. In short, the same Signs returning once, sometimes twice a Year, he upon taking the Medicine, voided sometimes a longer Piece, and sometimes a shorter, but never a whole Worm, but if the Dose was larger or stronger, it had no Effect. Thus he liv'd ten Years without any visible decay of Health, till being Sixty six Years of Age, he was seized with a Stupidity and Loss of his Senses, peculiar to Worms, which carried him off in four Days. Though in this heavy Distemper he took many strong Antimonial Vomits and violent Purges, yet he never voided a Piece of the *Tania*, till in his last Agony he excern'd together with much Excrement a large Piece with an entire whole Tail, which Piece was at least ten Foot long, and was not drawn with Hands, but found after the Patients Decease in the Sheets, and had like to have been cast together with the Sheets to be wash'd into the River, as another Piece was of five Foot, as I heard by the Servants; which, if the Head was joyn'd to this Part, was a great One.

IN an Insect of that Length, even from that Part where it began to narrow, 'tis hard to say how long the Tail was, or what Part of the Trunk might be reckon'd the Tail, unless we say the Tail begins where the Sides are not snag'd and jagged.

jagged: If we allow this Measure, the Tail of which we speak, was above two Foot long. *Fabricius*, says, that the *Tania* he saw, ended as small as a Thread, but does not tell its Length. But that of mine was like a yellow Thread of above a Foot in Length, and as small and fine as a Hair. Neither can we admire enough at this prodigious Workmanship of Nature since that so very fine a Thread, appear'd Mark'd with many thick black Spots like so many little Knots, according as it is describ'd in the Cut. The extream Part of this Thread I think, was not so like a Tail as some thing added to the Tail. The Upper Parts, and the Contiguous Parts of the same, or a greater Length, may very well be call'd a Thread, since they are very much smaller than the extream Parts of the *Tania* of *Spigelius*, or *Fabricius*. I kept mine by me for many Years, and shew'd it to our Physicians, for whom I had a Respect of Friendship, but being neglected 'twas destroyed by Moths. See *Tab. 7. Fig. 1.*

THUS much concerning the Formation of the Trunk of the *Tania*, and the Tail annex'd to it. There are various things writ by several Authors about the Length of that Worm, which shall be consider'd in few Words; and first I shall observe, that those Authors do not Treat of the Measure of the whole *Tania*, as consisting in all its Parts, since hardly any one of them ever saw this Insect *ολόκληρον*, so that whatever they tell of the Length of the *Tania*, we must understand by them those Pieces only that were off from its Body. So *Spigelius*, says in a Place already quoted, that he saw two long Pieces broke off from this Worm, the one above five the other eight Foot long. So have I seen many such Pieces,

Pieces, but none above twelve or fifteen Foot; but these were short to some mention'd by Authors. *Bartholomæus Cartichterus* says, he saw one at *Zurich* above nineteen Foot long. But that Fragment of the *Tania* said by *Fabricius* to be voided by a Woman, was I think above Three and twenty Foot, which was exceeded by a Piece, voided by a Woman at *Amsterdam*, occasioned by some Medicines given by the learned Dr. *Petrus Regis*, which Piece was above Seventeen Dutch Ells. Besides *Platerus* affirms that he several times saw broad Worms of about forty Foot long more or less, voided with so great an Impetus, that the Patients thought they had lost their Intestines. But all these are out done by a *Tania* mention'd by *Cæthæus*, in his Observations, which was Five and forty Foot long, which was prodigious.

PLINT, in a Place I have already quoted, hath Taught that there are *Tania* bred in the Bowels of Men, Thirty Foot and sometimes more, which Place *Spigelius* Observes, in his fifth Chapter of the broad Worm, and hath been by some Moderns, read *Trecenum* three Hundred instead of *Tricenium* thirty, which Errata is not in the small Edition of *Harduinus's*. Those Authors need not have gone to *Pliny* who was wont to inquire after prodigious Things, since at this Day there are Worms said to be almost Two hundred Foot long. If we have any regard to *Hartsoeker*, who in his Epistle annex'd to *Andry's* Work of the Generation of Worms, says, there was a Worm voided Eighty Dutch Ells long. But with submission to that Author, he may say what he pleases, since what he writes of that Worm hath not been proved. First the Worm, we speak of, which

which is in *Ruyfch's Musæum* at *Amsterdam* must not be confounded with *Andry's Solium*, since 'tis the same with the Genuine *Tania* of *Spigelius*. 2dly, this Author was Mistaken, when he attributed to one single Worm, what belonged to more Worms of the same Form and Kind. If all the Pieces of the *Tania* in the *Musæum* of the curious *Ruyfch* were measured, they would altogether make perhaps above eighty Ells, tho' they were never measured, for 'twould be in vain to seek after any Worm of such a length, therefore the common Error hath arose from hence. Many of these Pieces happen to come at several distinct Times from one Person, as I have heard that those Pieces of the Worm of *Ruych's* were all Excern'd by one Man. And as the Opinion of there being but one *Tania* bred in a Man hath occasion'd many Mistakes, thinking that all the Pieces of this kind of Worms voided by one Person, at several times, proceeded all from one single Worm; so the Pieces of the *Tania* that were for ten Years voided by that old Man, if they had been put together, or Proceeded from one Worm, would have made an Insect of a Monstrous length; neither can it be thought, with some Authors that the Pieces broke off from that Worm, should grow again in so short a time. But of this Opinion we shall Treat hereafter. Neither do I think that those forty Ells, which *Tulpius* says, were shew'd two Days in the Anatomical Theatre, came from the Body of one Worm. Besides. I doubt whether many Pieces taken from the Bodies of many *Tania* would make forty Ells. (See his 2d Book of *Observations* Chap. 2. publish'd in 1652) In the Editions of 1672 and 85. he explains himself in the following Words; 'tis seldom voided whole, but of

divided into many Parts, sometimes in one Tear, and sometimes many; every Piece being five, ten and twenty Ells long, such as mention'd to be shew'd us in the anatomical Theatre. Now these Pieces were very long if they were twenty Ells, which is twenty Feet. A French Chirurgion, whose Name *Bossu*, who lives now at *Amsterdam*, hath for these many Years at different Times voided a great Number of the Fragments of this Worm, Potful of which he presented to his *Czarish* Majesty's first Physician, Dr. *Areskine* and another to *Peter Regis*, who sent it to me, and reserved a third for himself. And, if I am not Mistaken, the Commentaries, for the 1711, of the *Royal Academy of Sciences* have taken their Remarks on Worms of a Thousand nine hundred and eighty inches long, from the Relation of the Worm kept by *Ruysch*, and publish'd by *Hartsoeker*. So *Borrichius* is under a greater Mistake, speaking of a Worm of above Eight hundred Feet long; for who can think that there is any such thing in Nature.

BUT to return to the Fragments, or Pieces of the *Tenia*, 'tis not strange that Authors should write so variously of their Length; for this Length must needs be different, according as they are broken when drawn away, sometimes coming easy and sometimes hard; therefore there can be no common and certain Measure. Yet if there be any room for Conjecture, in so obscure a Business, as I shall hardly be perswaded that this Worm is longer than the Intestines of Men, so I will not deny but that it may be of equal length. This being granted, I shall then make use of *Riolanus's* Words, 'tis observed says he, that the Intestines of a Man (which is the Seat of the Worm)

Worm) are seven times the Length, or Height of the Body, and if the *Tania*, be allow'd to be seven times the Length of a Man, the Length according to an exact Calculation may be about forty Feet thereabouts. This also seems to be confirm'd from Experience, if what *Platerus* says be true that he saw Pieces of the *Tania* forty Foot long and *Tulpius*, who saw them something longer. When such Pieces are sometimes seen, 'tis very probable they may be the whole Insect, except the Head, and Tail; *Horatius Augenius* mentions a Worm of fifty Feet, or five and twenty Cubits but that, as the same Author owns, was of the *Gourd Worm* kind, and so hath nothing to do with our *Tania*. But some perhaps will say, that the *Tania* may be longer, and that their Length should not be measur'd by the Guts, since the Insect how long soever it is, can contract and rowl itself up easily, so as not to take up the twentieth Part of the room it would when stretch'd out. To which I answer, there are no Examples of, so vast a length, neither is it likely it should be of that Extent. Lastly, we must take Notice that the length of the *Tania* varies according to Age, and they are therefore larger or smaller, as we shall see hereafter.



C H A P. IX.

The Description of the Head of the *Tænia* taken from many Authors, as well as my own Observations.

WHEN we inquire into the Head of the *Tænia*, we must be very careful, lest we take the False one for the True, since that Authors have delivered on this Head are so doubtful and Contradictory. If we may believe *Abucinus* (in his *Commentary of Worms*, Chap. 13.) where he says, 'There was seen in the Year 1538, in the City of *Ravenna* a whole entire broad Worm, with a sharp Bill and Beak, like the Needle Fish, which moved and contracted itself like an *Earth Worm*. This Worm liv'd almost a Day in a brass Vessel full of Water to the Admiration of all present and of the whole City. This was voided by a Boy of sixteen Months old'. *Rondeletius* treating of the *Tænia* hits upon the Head of this Insect two Words; The *Tænia*, says, *Rondeletius* in his treatise *De dignoscendis Morbis*, is a Worm of two foot long voided upwards and downwards. 'Tis white, many Parts like Gourd Seeds, snagged on the Sides, and bath a little long Head and a short Tail. Those things that are voided like Gourd Seeds, are pieces of When I was at the Camp at *Perpignan*, A Soldier's life; after eating Onions voided one of two Cubits, which I kept, 'twas like in the Cuts or Nicks of the Body a Caterpillar, had no Eyes, and was not distinguishable in the other Parts. 'Tis call'd *Tinea*, because 'tis white and long, like a Sea Worm, and broad from its breadth, whereas all other Worms are round, and this broad and small.

Foreſtus, (*de Intestin Affection*. Chap. 36.) ſeems in theſe following Words to explain the Formation of the *Tania's* Head: ' A Youth, who was very much
 ' Griped about the Navel, Nauſeated every thing,
 ' and had no Fever upon him, voided ſomething
 ' with his Excrement like Gourd or Cucumber Seed,
 ' whereupon I conjectured he had *broad Worms*,
 ' ſince that was a certain Sign. I preſcribed him a
 ' Drink of the Decoction of Centaury and Worm-
 ' wood, and ſome Aloes Pills; it being plain that
 ' he labour'd under the *broad Worms*; for after he
 ' took the foregoing Decoction, he voided by Stool
 ' Worms of a prodigious Length, *ending at the Point*
 ' *like a Shoe-maker's Awl*; which Worms had firſt
 ' ſtrangely rent and tore the Guts; but upon re-
 ' peating the ſame Medicine mix'd with Onions
 ' the green Radish Root and Muſtard Seed, and uſ-
 ' ing the Decoction, he voided twelve long Worms
 ' and afterwards recover'd'. Certainly *Spigelinus*
 thought *Foreſtus* ſpoke of the Head of the *Tania*
 when he ſays, the Worms voided by that Youth
ended at the Point like a Shoe-maker's Awl; but I
 don't ſee why he would ſhew by this Point the
 Head rather than the Tail, ſince the Verb *Deſinere*
 to End, ſignifies rather the Ending than the Be-
 ginning. However it was, *Spigelinus* commending
Rondeletius, *Gabucinus* and *Foreſtus*, not only ſub-
 ſcribes to their Deſcription of the *Tania's* Head, but
 adds ſome Ornaments to it; *Rondeletius*, ſays *Spigelinus*,
ſaw a little Oblong Head of a Tania without Eyes.
Gabucinus ſeems to call it a *ſharp Beak or Bill*, from its
Figure, which he compares to the Beak of the Needle Fiſh.
Foreſtus, ſaw it in a Youth, End like a *Shoe-maker's*
Awl. The Head is commonly thought by many to be
 ſmall, with ſome few Feet in the Nature of Spiders
 (as if, as *Vallisnerius* obſerves in this Place, Spiders

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or any other Insects had Feet in their Heads). But I, continues our Author, than whom for imagination there is not a bolder or readier Painter giving him the Reins, *tho' I never saw the Head, I guess that 'tis small, ending sharp, and like a Bill, as with other Worms, which they are wont to shoot out, contract and draw in at their will, like as Snails do their Horns, and many other Creatures their Tongue, and Flyes the Epiboscis or Front.* But *Amatus Lusitanus*, praised by *Spigelius*, proposes a Head of the *Tania* different from the foregoing: A Woman of *Sclavonia*, says he, who was in a good state of Health voided by Coughing at her Mouth, a live Worm of four Cubits; which Worm the Surgeons brought to me to see, but when just dead. This was a very wonderful Worm, such as I never saw before, of about four Cubits in Length, as I said, of a small Breadth, about half a Man's Nail, of a white Colour, and of the same Substance as the Guts, but had something of the Snakes's Skin. This Worm's Head was rugged and white, from which there proceeded abroad Body, which the nigher he was to the Tail became the smaller. It was also but one Body, having many Divisions; for the Pieces of this broad Worm, which seem'd to contain nothing between, by Reason of the Compression of its broad Body, were like the Gourd Seed. But this Woman, as she told us, did not void this Worm whole at her Mouth, but that great Pieces broke off downwards.

BUT let us see the rugged Head of *Andry's Solium*, of which I have already spoke; but our *Tania* ought not to be confounded with the *Solium*, neither does it sufficiently appear, which Kind of broad

Worms Lusitanus saw, since he speaks too obscurely and is too brief on this Matter, for us to conclude any thing certain from his Words.

Rondeletius's Descriptionis, also as unhewn'd and imperfect, as 'tis Uncertain which Species of Worm it is that *Forestus* lays down, in the foregoing Place though those Excretions, he speaks of, like the Cucumber Seeds, seem to persuade us that he treated of the second Kind of *Tania*. Lastly, let the Reader judge what Credit may be given to *Spigelius*, who owns he never saw the Head, but delineates its Form and Shape from his own Imagination, so that *Gabucinus* seems, only to have given the truest Description.

BUT the first after these, that I shall take Notice of, are *Tulpius* and *Michael Febr*, who have described and taken Care to delineate the Head of the genuine *Tania* of human Intestines, but the Difference between the Description and the Cut is wonderful. The Figures which are very like one another, testify, that the Body or Trunk of the Body of our *Tania* is drawn by both very exact. But when the Head given to it, is altogether unlike the Body, it necessarily follows, that one of them must be False; and *Tulpius* hath set forth the two Cuts of that Head, much different from one another. In his Edition. 1652. Of his *Physical Observations*, Book the second. Chap. 42. We find these Words. 'Many Authors have described the broad Worm, but always in Pieces, and only so far as to the Head, which I shall endeavour to add to it as faithfully as he who voided it in *Zeland*, described it, and afterwards related it to me, which is here faithfully inserted.'

The History of Worms. 133

' *Hen. Ringen*, a young Man of *Middleburgh*, and a Kinsman of *Augerius Clusius*, was once reduced to such a want of Drink, that he was forc'd to drink Ice, which so weaken'd him, that a loathing of all Meat ensued, and he would often fall into such Fits of roaring, and such Gripings of his Bowels, together with Faintings and such Gnawings in his Belly and Guts, that he was confident he had some living Creature within him, which appeared to be so by the Event. But after he had lived in this Misery for two Years, he began, by *Logadius Species*, to excern several Pieces, of a broad Worm, and among the rest, one of six, another of three Ells long. To which last Piece, he solemnly affirmed, that Head which the Cut expresses was cleaved and adhered.

' BUT this Head as it is short, so 'tis flat and broad, and of the same Colour-as the rest of the Body, but the small Incisions, with which this Worm is Marked, were closer to each other. On this Head there budded out two Horns, like to those of Snails; one of which was broke off, in the difficulty of the excerning, from whence there dropt away three or four drops of Blood, but the other was unhurt, and about its top was Rough and Hairy, yet there was no Mouth or Aperture, upon the want of which, what is more likely than that, it was Nourish'd by Sucking? But the Neck which was to this Head, as it was the length of two Thumbs breadth, so it was severed, and divided in the middle of that Aperture plainly appeared, which the Engraver hath shaddow'd by a black Spot. After which the young Man was free from all Pain, and Uneasiness, and went very well into *Russia*. See *Tab. 8. Fig. 1. B. Rhodi-*

us seems to have seen much such an Head in a little Dog, to whose Guts, he says, a broad Worm cleaved, which was like a white Tape, with a cleft Head, (Vid. Observ. Medic. Cant. 1. Observ. 59.)

And the same Tulpus, in his Editions of 1672, and 1685, in the 2d Chap. of the 2d Book of those Observations, which hath this Title, *The true and genuine Head of the broad Worm*, hath these Words:

‘ Many Authors have describ’d the *broad Worm*, but
 ‘ always in Pieces only as far as to the Head, which
 ‘ is here added to it; which is not a false or feign’d
 ‘ one, but a True and Genuine one inspected by Vi-
 ‘ quius, Arnaldus, Tholungius, and many other Phy-
 ‘ cians of a doubtful Faith; and not only once
 ‘ but three times as often, as the Wife of William
 ‘ Smetius voided this Insect, which was sometime
 ‘ in Pieces, but three times she voided it whole and
 ‘ complete. This Head was both flat and sharp
 ‘ and had a small Mouth of the same Form as the
 ‘ Cut, done by Salomon Saverius expresses. See
 ‘ Tab. 8. Fab. 1. A. This Insect (if we credit Gal-
 ‘ len in the 26th Aphorism of his 3d Book) extend-
 ‘ itself through all the Guts, and rarely comes
 ‘ away whole, but more frequently, divided into
 ‘ many Pieces, and that at various times, some-
 ‘ times in one Year, and sometimes in many, ev-
 ‘ ry single Piece being sometimes ten, and some-
 ‘ times twenty Ells and above long; such as
 ‘ mentioned was seen in the *Anatomical Theatre*
 ‘ which were too large for the Belly to be stimul-
 ‘ ted by Logadius’s Species, Alandal Lozenges, or Tra-
 ‘ lianus’s Pills, which Medicines we make use of.

THE following Words, and the Cut plain-
 show how different the Head seen by Febr, was
 to this: ‘ This, says this Author, I think man-
 nify’s the Nobleness of Jalap, from many Expe-
 ‘ men

ments. Among others, I remember that a *broad Worm* in many Pieces of some Ells was expelled by it, which Worm ended, with a Neck that grew narrower and rounder, *in a very small rough Head, like three Poppy-Seeds joyn'd together*, which for its Rarity, I shall here add a Cut of. See *Tab. 8. Fig. 2.* The Patient who was a Soldier, took great Pleasure in inordinate Eating, and to drink Milk, and was sometimes taken with a sudden Swooning and frequent Gripes, but after he voided the Worm, this ceased. Also *Schmidt* takes Notice of such a Worm, which after a strong Purge, hung out at the *Anus* of one of our Citizens'. Thus much for *Febr.* But in the same Page, where the Cut of that Worm is contain'd, these Words are added for its Explanation. 'The Piece of a *broad Worm*, which after the taking of the Chologogick Powder with Jalap, and after frequent Excretions, hung out at the *Anus*, and was drawn away by the Patient. The same Patient also voided some broad and separate Pieces of it. This Piece might be extended almost six Ells long, and seem'd to move, and when Dissected like other Insects, the Head was cut off. *Feb. Swinfort, 1644.* The Incisions at the Neck grew narrower by degrees, but I saw no Horn there, nor that black Spot delineated by *Tulpius*, in his 2d Book of *Observations*.

I find in the Works of the learned in 1680, in *French*, another Description, and Cut of the Head of the *Tania* very much different from all the former. Though (says *Dr. Panthot* formerly a Physician of *Lions*, in his Epistle to the Author of those Works.) 'Many Authors have Writ of strange and monstrous Worms, and have found the same

Kind of Worms in all Parts of the Body, to differ in Figure Number and Quality; yet notwithstanding, all those were as Extraordinary, as the Worm I saw, and those things as curious, which are observ'd in the Difficulties to remove them, yet in such Cases Help and Relief may be had. A *Franciscan* Monk, call'd *Francis de la Croix*, 45 Years of Age, and of a robust, but melancholy Constitution, who liv'd at *Lions*, complaining of cruel Pains in his Stomach and Belly, attended with a Pain at his Heart, and a canine Appetite, (which Symptoms he said gave him Notice of voiding a Worm like a Snake, at least seven Ells long) ask'd my Advice.

UPON the hearing of this, I was amazed; but he affirm'd that he had voided many other such Worms by Stool, for 14 or 15 Years, and said that they were wont to come away every six Months, upon taking twenty Grains of *Mercurius dulcis*, and as many of *Rubarb*, and ten of *Aloes*, made up into a Bolus, with Syrup of Worm-wood. I told him that as he had Experienc'd the Effect of this Medicine, he shou'd take it again. Which accordingly he did, and thereupon voided a Piece of Worm above three Ells long; but was not the easier, his Pains rather increasing with a greater palpitation at his Heart and coldness at the extream Parts, insomuch that the Physick working more violent, he thought he should die. Now all these Symptoms are to be attributed to the Head, which remain'd with some Part of the Body. But as this Medicine brought too great a Heat, as it seem'd, on his Bowels, which it did not use to do, he was frightned, and sent for me when I came, I found so Weak and so Ill, that

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found I could not give him any stronger Medicine, which on such Occasions we do, to Purge more briskly, and as I had Citron Juice enough, I mix'd it with the same Quantity of Olive-Oil, and gave him to drink, plying him afterwards with frequent Clysters of Milk and Sugar. Having drank this more gentle Medecine, the *Monk* was very much eased in four Hours time, and felt something move downwards with the Medicine; thus he continued three or four Days, and by the use of these Medicines found himself free entirely from all Pains, and other Symptoms, that he thought he was restored to his former Health. And at last he voided the Head of this Monster. It was black, in the Shape and Form of the Crescent, as Represented in the *Cut* by the *Letter A.* The length of the Body was above seven Ells, the breadth of the Tip of a little Finger; the thickness of a Crown piece; the whole Body was Hairy, as the *Letter B.* shows, Scaly like a Snake, and of a grenish Colour. See *Tab. 8. Fig. 4.* This kind of Worm hath been seen by many Physicians, who have Written of it, and call it a *broad Tape-Worm*, from its likeness to a *long flat Tape*.

‘ B U T what is wonderful, and worth our Consideration is, that this Worm, when broke and divided into many Pieces by the Medicines, should live, and that the smallest Parts that remain, shou'd increase and grow again, so that this seems to Regenerate; and as this encreases, the Hunger likewise augments in the Patient. I enquired of the *Monk* what was his manner of living before, or whether he thought he could ascribe this extraordinary Effect to any Cause. He said, he believ'd it proceeded only from the Incommodiousness of a Monastical,

‘ ftical Life, or the Terror with which he was seiz’d
 ‘ upon seeing a *Monk* of his Order void fuch a Mon
 ‘ fter, from which time he had never failed to ex
 ‘ cern every fix Months this kind of Worms,

‘ I N Women fuch prejudic’d Imaginations are
 ‘ no Novelty ; but in a Man of a robuft Conftitu
 ‘ tion, quite different from that of Women, whofe
 ‘ Sex is weaker, and the Brain eafily mov’d, it feems
 ‘ prodigious and out of the Way, to have Contrac
 ‘ ed that Evil by a depraved Fancy. There are
 ‘ none or very few Examples of Men who have
 ‘ precipitated themfelves into fuch Accidents by I
 ‘ magination. Without doubt this Terror affifted
 ‘ the preceding Difpofition, and confummated the
 ‘ Work of the Humours, which were the Seed and
 ‘ Spawn of that Monster; yet after the Excretion
 ‘ of this Worm, the *Monk* continu’d ftill to void
 ‘ every fix Months pieces of thofe Worms; and
 ‘ I doubt not, if he fhould ever excern the Head
 ‘ of them again, it would go very hard with him

THU S far *Panthot*, and I don’t find the Head
 of the *Tenia* describ’d by any other Authors, be
 fides thofe already mention’d; what *Tyfon* hat
 concerning the Head of the *broad Worm*, relates on
 ly to the *Gourd Kind*. *Meifnerus*, according to
Scultzius, fays, he expell’d by a Medicine he gave
 a *Butcher*, a *broad Worm*, nine Ells long, with
 reddifh Head, but fpeaks not of its Form.

Now that Form is fo variously Represented by
 our Authors, that ’tis not with the Proverb, *So many*
Men, fo many Minds and Opinions, but feems to be
 fo many Opinions as there are Men; that I am of
 Opinion, that all thofe things that have
 been faid on this Argument by thofe various

Authors, are false and feign'd. But when this my Work was not only just begun, but just finish'd, and despair'd of ever finding out the Form and shape of that Head, *Renatus Garnerius*, a very skillful Surgeon of ours, who knew that I had begun to Write of Worms, came on the 26th of March. 1713 to me, bringing a Piece of a *Tania*, that he affirm'd had an Head. But inspecting this Head, I saw in the Upper and Hinder part, if not a Form like a Half-Moon, such as *Panthot* Set forth, at least one that Resembled a deep bowing out, whence at first, I suspected that Form might be attributed to chance only. This *Tania*, said I, with myself, when 'twas voided and drawn from the *Podex* hath been so broke, that one of its Ends hath broke in to this Form; as we frequently observe in the Pieces of many of these Bodies, which as they are differently broken, assume various Forms. But considering this Affair cautiously, and with regard, I could in the first Place find nothing broke or torn; secondly, the Plate, which the Head of the Worm had, did not only appear rounder and longer, but also was thicker than the other inferiour ones, and was distinguish'd, besides with three long or straight white Lines, not to be met elsewhere; thirdly, the above mention'd Bow ended with two sharp Prominences, or Horns on either Side one, from each of which, there proceeded a sharp Point, like a fine Thread, or Hair. See *Tab. 8. Fig. 5.* Therefore I began to think that this was the true Head of the *Tania* so long inquired after, and I was the more induc'd to it, because in all the Pieces, which were many, that I had seen, I never observ'd any such thing.

BUT when, I had put this Piece of the Worm for some Days, in Spirit of Wine, the Trunk of the

the Body, which new and fresh, was the breadth of almost five Lines, was contracted and drawn together, so as hardly to exceed the breadth of one, but the Head at least retain'd the breadth of two Lines at least, neither did the thickness of the Horns, whose Points were not diminish'd, appear much less than before. This confirm'd me that those Parts to which I gave the Name of the Head and Horns, differ'd from the other Parts of the Body, because they were firmer, and harder by much; for otherwise if those Parts, which I call the Head, had been as tender and soft, it wou'd not have been broader than the Trunk, and the Horns; but chiefly their Points, preserving due Proportion ought to become invincible, when contracted in the Spirit of Wine. From this Experiment I learnt that those Horns, if we speak Nicely, should not be compared to Snails Horns, which as they are smaller, and by Consequence softer, do not appear in the Snail when Dead. That Head is also changed into the breadth of almost three Lines of which we just spoke; the other Parts are not white as before, but degenerate into so many Wrinkles; and the first Plate annex'd to the Head, and the rest tho' contracted are Mark'd with black Spots, like those we have already spoke of, and by this Mark are distinguish'd from the Head. Lastly, from the same Experiment or putting them in Spirit of Wine, we might more easily know the Form and Nature of those Horns, and chiefly their Points, which were as plain in this Insect when dryed, as when fresh and moist. For from the Ends of those two Horns the Point was longer than before, and was thrust out like the Talons and Claws of Birds, and of other Creatures, and of the same Form in the Head as they are represented in the *Tab. 8. Fig. 6.* But

I was searching to find, whether any such thing was observed by Authors in the Heads of other Insects, I met with a Worm delineated, and described by Goedartius, No. 107, and called by him *Erucarum hostis*, having in the upper part of its Head, two little open Claws, which open and shut like a Pair of Pincers, and by which that Worm peirces the Belly. Neither did the other Part of the Body of that Worm seem much unlike our *Tania* in the Incisions, of which it had many. See *Tab. 8. Fig. 7.* Tho' so far there was some likeness between these two Kinds of Insects, yet the points of those Prominences of the *Tania's* Head, seem'd very much to differ from the Claws of the *Erucarum hostis*, because the first were small and flexible, like a Hair, and these ought to be stiff and hard as to besmear the Belly of the *Palmer*. But I did that the bending of those Hairs did not appear in that Worm, when fresh and just voided, but was at last observed by me when the Worm was just in the Spirit of Wine, from whence it may be infer'd, that as they were strait before, they might become crooked, Compare *Fig. 6. with 5. in the 1st Table.* But another Use may be assign'd to the Hairs of our Worm, and that not different from the Use of these kind of Hairs, which appear on the Head of other Worms or Insects. Two such Hairs are observ'd to be on the upper Part of the Head of the *little Dragons*, of which we shall speak hereafter, and are call'd their *Beard*. Many other Insects seem, from *Vallisnerius's* Conjecture to have these Sort of Hairs, by which they find out their way. But though the Horns are not hard and sharp enough to peirce the Guts, yet by the afflux of Spirits, they may grow so stiff, as by nervous Fibres cause sometimes Pains; but this is rather a Tickling

ling than any Sense of real Pain, which is felt by their rubbing against the Guts; which Symptom as we shall see hereafter, is common to them who have the *Tania*. Now whether the *Tania* may be bending these Horns, cleave to the Guts, or hang by them, I do not know. Whatever was in the Space between the Horns or in the bottom lying between the Bows, for we ought to search after the Mouth, to speak ingenuously, I could not plainly see either when fresh or dry; though I observed a little tubercle rising in the middle of the Bow or Bow in which I thought 'twas likely the Mouth might be Seated, though there was no remarkable Aperture; but only a kind of a small Hole. It may be these Parts would have appear'd plainer, if the Worm had been alive, but as 'twas brought to me dead, and that I did not use a Microscope, I could not discover and see things more plainly, and distinctly.

At the same time I ask'd my worthy Friends and noted Physicians, *Isaias de Communi*, *Jacobus Chenaud*, and *Jacobus Mangetus*, so well known by his many learned Works, to come and see me, and to whom I had before shown the Tail of the *Tania*. They all saw this *Tania* with the Head and Horns now describ'd and concurr'd Unanimously to my Opinion, that this was the true Head of the *Tania*. Besides these three younger Physicians *Petrus Colladus* and *Joannes Robertus Butini*, and my Son *Jam. Clerk*, who drew that and other Parts of the *Tania* as well as he could, were of the same Opinion. I shall not mention many others to whom I showed this Head, when dry; but indeed we could not tell what this Part should be, unless 'twas the Head. For laying aside all other Signs, and Arguments, the Horns, as well as them, with the two Points

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ded to them, cannot be said to be Fringes hanging from the soft and torn Trunk of the *Tania's* Body, first, since, as I said before, nothing appear'd to be torn, secondly, when handled by me and others, did they seem to be broken, or when put into Spirit of Wine to disappear. From hence we may gather that these Horns or Points, seem to denote one End of this Insect, and if this is one End, certainly 'tis not the lower End, but the upper, otherwise the Head we saw ought to differ very much from it.

THUS much I have said concerning the Head of *Tania*. But some one will reply, if this was the true and genuine Head of the *Tania*, what becomes of all those other Heads of this Insect that have been mention'd, and are different from it? I answer, 'tis likely that many Authors who treated of those Heads might be Mistaken, especially in so difficult an Inquiry, and that some who saw it, I have described it, had not described it, or denegated what they saw accurately enough. Among the former, we may reckon *Rondeletius*, *Forestus*, *Amatus* and *Spigelius*. And as to *Fehr*, who ever considers the Matter, will not be able to know what he meant; for first, if we weigh and consider his Words, wherewith he describes the Head of the *Tania* that he saw, we shall find them altogether incongruous with his Cut; for he Assigns to that Worm, a little black rough Head, like three Poppy Seeds closely joyn'd together; but if we look into the Cut, they are not three Poppy-Seeds, which are so fortified, but three round Balls, somewhat bigger of the Size of Hemp-Seed, united together. But this might be the Drawer, or Engravers Fault, and not the Authors, therefore it does not lie at his Door. Now when I compare the Cut of that Piece of the *Tania* with

with those of *Spigelius*, and *Fabricius*, I find no difference in the other Parts between them, but I perceive in this that what they take for the Tail, he accounts the Neck. I cannot believe what *Tyson* says, that *Spigelius* should be so Mistaken as to call the Neck the Tail; who had seen that Tail whole with the fine Thread added to it, than which there is not a more certain Sign of it; and since I find the Head of our *Tania* in the broader Part of the Body, which this learned *English* Writer does not allow, who thought to have sought for it in the smaller Part. Therefore I Conclude that *Febr*, hath without considering the Thing, been led into this Mistake, for certainly the End, which that Author saw, was the Tail, and not the Head; and those three Granula like Poppy-Seeds, might be form'd of some hard concreted Juice, sticking to that Part of the *Tania*.

THUS 'tis plain that those Authors, who have been so Mistaken in the Description of the *Tania*, have never seen it, such as it really is; but I know not whether I ought to Number *Gabucinus* among those Authors or not, since he mentions a *Tania* which he saw with a sharp Bill or Beak, like the Needle Fish, which I believe, or at least suspect, was not much different from ours, as to its Form, when I consider that those two Prominences lately described were something like the Beak of the Needle Fish, half open. For the Form of those sharp Prominences, and of the Bow or Bay between, may seem like that of the Needle Fish. (See Tab. 8. Fig. 3.) but, then, *Gabucinus* was very much in the Wrong, who thought those Horns to be a Beak or Jaws. For in all Creatures there is an upper and an under Jaw, neither is the Shape of those Prominences, which are so plac'd to be in

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stead of Horns rather than a Beak, in either of the Jaws on each side of the Head or Mouth.

Tulpius in his latter Editions of 72 and 85, gives us the Beak of his *Tania*, not gaping as *Gabucinus's*, but shut, that any one would think by that, he had seen these our Prominences, not gaping, but shut close together. And thus he is in as great a Mistake; for if what I saw was the Head of the *Tania*, or what he saw was like it, it had certainly two Horns, which for the aforesaid Reasons, are call'd by him a Bill or Beak, but if any one affirms that the Head, which was seen by *Tulpius* was different from this, and should contend that this *Tania* hath a Bill, and not Horns, this Matter will always remain in Dispute. For no one will be perswaded that he can find two such long Jaws, which make a Bill in a Worm, whose Form is quite flat, and the thickness does not exceed a Line, since as they are long, in Proportion, they ought to be thicker, and stronger, than the small and tender Body of this Worm can bear. Moreover it cannot be thought, that same Body where its Trunk is extended, and it becomes small and flat, should be chang'd from the lower Parts to the upper, which is the Neck and Head, and grow thicker and rounder. Neither do I understand what this Author Means, when he affirms that the Head is not less sharp than flat, and hath but a very small Mouth, like as 'tis Represented in the Cut. If we consult the Cut, this Head will not appear to be flat but round, like a Birds Head, But I am afraid the Painter, or Drawer, indulging his Genius, after their manner, and in imitation of which the Poet says,

Quid libet audendi semper fuit æqua Potestas;

hath rather feign'd the Head we speak of, at his

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Pleasure: than drawn it, and hath added some other Ornaments, as Eyes, to grace, and set off the Head, which makes good the *Italian* Poet's Words,

*è tuperdona
'S'ntesso freggi al ver.*

Now I cannot be perswaded that *Tulpius's Tania* had large Eyes, as they appear in the Cut to be open; for certainly if it had those Eyes, this Author who labours to be brief, would not to pass them by in the Explanation, have made himself obscure: *Pliny* says, *Worms have no Eyes*, which I do not admit generally, without any Limitation, since *Malpighius* observ'd in the Heads of Silk-worms, some clear Globules, which he thought might be reckon'd Eyes; yet I don't think that Eyes shou'd be assign'd to all Kinds of Worms, and much less to our *Tania*, which lives in those Places where there is no Passage for any Light, and therefore cannot want the Sense of Seeing. *Bidloo* ascribes Eyes to the Worms he found in the Livers of Sheep, but whether he might not be led into this Mistake by his Microscope. But passing by *Tulpius's* last Editions, let us consult his first and consider both the Description, and Cut in those, for there he seems to describe, and delineate such an Head as that I saw. *This Head*, says *Tulpius*, *both was short and flat, of the same Colour as the rest of the Body*; and a little after, *and on that Head their jutted out two Horns, like to Snails*, and at last, *one of these Horns, for (one was Whole, and the other Torn off) was about the End or Point very Hairy, neither did there appear any opening of a Mouth*. Thus he and I did agree almost in all things, except those Hairs or Down for I only saw one, but this is a Difference of no great Moment. Neither do I see the Incisions, which

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are united much closer in the Head than anywhere else, or that long Head and the Neck, or Gaping describ'd by *Tulpius*; but perhaps the Gaping had not appear'd here if nothing had been Torn in the Worms Bodies.

If we look into the Cut, and Explanation, we shall not only see two Horns, but two Heads, the one lame and Deficient, the other Whole and Entire. Now that Worm is by the Author call'd *Bicornis*, having two Horns, not Biceps, having two Heads, so that the Figure of the Head here engraved, seems to be done by the Drawer, on his own Head. But in the Head set forth by me, I can safely Swear it is rather Deficient in Nature, than hath any Addition by Art, and that the rough Cut expresses.

NEIEHER, do I think the Head which *Panthot* describes, different from *Tulpius's* and Mine. And I wish that he had given us the Cut of that Worm, or added a more accurate Explanation, whereby he might have made Amends for the want of the Cut, by supplying it with some words that were wanting. And those two sharp Prominences to be seen in his Cut, which the Painter or Engraver hath set at too great a Distance, like an half Moon, but which I have drawn nigher, are evident Signs and Arguments, that he design'd the Head, as I have Describ'd and exactly Delineated it. And I own the Difference is very little or not at all, since those Prominences might be brought to, or widen'd out more or less, according as they were handled; and so were Delineated, both by him and me, but *Panthot* is in the wrong to give the Name of Head to these Horns, if they contain'd, or made up the whole Head, or that the Head of any Creature could be of that Form or structure. And *Rhodius*, in a Place already quoted

seems to be of the same Opinion, saying, the Head of the *canine Tania* was cleft in two. Neither are the Hairs, by which these Points end, Describ'd or Delineated by *Panthot*, whether there were none, or by Reason of their smallness, he did not see them, or neglected them, I know not: And the Trunk of the Body of that *Tania* is not so very nicely Drawn in relation to the Form of the Plates.

BUT what shall we say of the *Down*, with which, if we credit our Author this *Tania* was cover'd. He indeed says, this Kind of Worm hath been seen and observ'd by many Physicians, who have written of it, and call'd it the *broad Tape-Worm*, but since none of them made mention of that *Tape-Worm*, Nap or Down, and the *Tape-Worm*, or *Tania* seen by *Panthot*, was quite Different from those others, which were describ'd, he ought not to have confounded them together. But I who am very Diffident of these Monstrous things, and having learn'd that Supicions should be Supported by Examples and Proof, and being desirous to be satisfy'd in this Affair, I writ to my Friend Dr. *John de Ville*, at *Lions*, enquired of him, if he knew any thing of this rare and hairy *Tania*, of his Fellow Collegians. He answer'd that he was at that time a Doctor of Physick, and of the College at *Lions*, when the Rumour was spread Abroad concerning the Worm described by *Panthot*, and the Monk, who voided afterwards several Pieces of the same Worm, and that this Monk came and told them the Medicines he had taken, and by which he had voided this Piece of *broad Worm*, and thereupon was cured. He added further, that this Piece was given by the Monk to one *Aubernon*, a Surgeon, at *Lions*, who is yet living, and who put it into Spirit of Wine and kept it a long time; and that he, and that Surgeon had both carefully inspected it many times.

Head and could affirm that it was not in the least Hairy. Therefore if the *Tania*, of which there are two worthy and credible Witnesses alive, was not Different from the common *Tania*, nor set with Hairs, that must we think of the other Hairy one, which we credit *Panthot*, was voided before by the same Person? And if we say, that there are several Kinds of *Tania*, some Hairy, and others smooth, the sick Person at that time had but very bad time of it. Let them believe it that will, for my Part I shall be something slow in Faith, till I have some more certain Proofs of these Hairy *Tania*. The Medicine which, in this and such like Cases, this Dr. de Meuse used, as I heard from himself, was nothing but a Decoction of some simple Bitters, to be taken three times a Day between Meals for a Month together, for this Physician thought that a long and obstinate Disease ought to be resisted by a Medicine longer continued, and this Method he protested he used with good Success.

A CURE perform'd by *Garnerius*, shows us also the daily and continu'd Use of Medicines in this Case, by which Cure, as I had it from himself, a Piece of that Worm, to which the Head adhered, was voided with many others. 'In the Month of February, 1713, says, *Garnerius*, a Man who lived in Geneva, and was a Tape Weaver by Trade, of above forty Years of Age, of a melancholy Constitution, a brown Complexion, and Lean withal, and troubled with Piles, complained of a Pain at his Stomach, and Head, a Strangury and Heat of his Reins, with a heavy weight at the bottom of his Belly. The gland of his Yard was cover'd with little red Spots, like the Measles, and from these and the other Symptoms, I and every Body thought he had the Venereal Disease. I gave him these following Remedies, First to
' drink

' drink Morning and Evening for sometime and
 ' mulſion of the cold Seeds, then I gave him a Bo-
 ' lus of the Pulp of *Caffia*, and *Turpentine* of Chi-
 ' to be taken with Meat-Broth, with Water-Creſſ
 ' in it, and then for the Space of ten or twelve
 ' Days, to uſe the following Decoction. Take
 ' the Root of *Saſaparilla* two Ounces, *Gujacum*, I
 ' quorice, and *Senna* one Ounce; *China* Roots ha
 ' an Ounce; *Sal Prunella*, one Ounce, an Handful
 ' Aniſeeds, and boil them in Water to fix Pints
 ' a Decoction, of this the Patient took for ten
 ' twelve Days, three times a Day, in the Mor-
 ' ing, and two Hours after Meals. The laſt Day
 ' preſcrib'd a Bolus of the Pulp of *Caffia* half
 ' Ounce, Confection of *Hamech*, two Drams, of Rh
 ' bard and *Mercurius ducis*, each a Scruple, drinki
 ' a Glaſs of the Decoction after it. By the help
 ' this Medicine the Patient at firſt, voided a Pie
 ' of a broad Worm ſeven or eight Foot long, co
 ' plaining at the ſame time of a cruel Pain at
 ' Stomach, and attended with a cold Sweat. A f
 ' Days afterwards I ordered him to drink the ſa
 ' Decoction again for ten or twelve Days, and in
 ' der to Purge away the remains of that Worm, I a
 ' ded half an Ounce of Worm-ſeed; which when
 ' had done he return'd to his Buſineſs, but bei
 ' taken with a ſudden Fainting, and a Motion
 ' go to Stool, he voided a Piece of a Worm abo
 ' three Foot long, which he ſaw move. When
 ' ſent for me, and I examin'd this Piece, I thoug
 ' this Head of the Worm, whoſe upper Part w
 ' ſomething like a Creſſent, was annex'd to
 ' Beſides ſome Days after this ſecond Pie
 ' was voided, I had a mind to try, wheth
 ' there remain'd another Piece of that Worm
 ' this Man's Inteſtines, and therefore gave t
 ' former Bolus, adding only five Grains of M

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curius Dulcis; whereupon he voided a third Piece, which seem'd to be above five Foot long, of a different Form from the former, having its Sides jagg'd and snagg'd. From that time, that Man was much better, but liv'd free from all Pains, and the other symptoms.

Thus far *Garnerius*, by whose Care these three Pieces of the Worm were brought to me; and I think these contain'd a great Part of the *Tania*; the first Piece which I took to be the Hinder part and End of the *Tania*, was narrowest, and not above two Lines broad; the second Piece, which was five Lines broad, I took to be the Upper part, or that as I have observed to which the Head is joyn'd; and Lastly, the third, which was of the same breadth seem'd to be the middle Trunk of the Insect. All these Pieces, I say, whose Length if put together, would make sixteen Foot, seem'd to contain the greater Part of the *Tania*, but not the whole Body, because the Head was wanting, and something might be broke from the other two Pieces, and voided unknown to the Patient. *Garnerius* observ'd that the Form and Make of the third or last Pieces was Different from that of the others, as to the Sides, or Edges, which were more indented and jagg'd; but it does follow from hence, that this Piece was broke from the Body of another different *Tania*. For the Notches were deeper for no other Cause than that this Piece of the *Tania* had laid longer in the Guts, and was not presently excern'd, such a thing as I observed in the Description of the Sides; and I understood that the Cause of this Change proceeded from that, since that Part seem'd to be putrify'd, and Set with black Spots, in the Guts, so that it could not be touch'd without breaking.

ing. But this *Tania* was of the lesser size, since in the broadest Part 'twas scarcely five Lines broad, whereas in a few Days after the industrious *Garnerius* brought me a Piece of another larger *Tania* nine Foot, and above six Lines broad, voided by another Patient. He thought also that this had a Head to it, but upon Examination, I found that Figure which appear'd here like an Half Moon so formed that the Sides where this Piece was broke off from the Body, remain'd whole, and the middle Part of the Piece was turn'd out.





C H A P. X.

Whether there are many Tænia, or only one found in the Intestines of Men, and consequently whether the Tænia breeds? That the Tænia of the first Kind, is one single Worm and not many.

HAVING compleated the Description of the *Tania*, we come now to the Questions that are raised about its Nature, and the Sigas whereby it is known, and the Symptoms arising thence; and Lastly, the Remedies whereby this Distemper may be removed or carried off. The first of these *Spigelius* begins with, enquiring first, *whether the Tænia is an Animal or living creature?* But on this Question, I think it is not I should insist any longer, since I have answered fully in the foregoing Sheets; and since 'tis plain from the Testimonies of those various Authors, quoted that the *Tania* both lives and moves.

SECONDLY, He enquires *Whether there are more than one, found in the Intestines of Men?* To this I answer, That there were many Kinds of the *Tania* broad Worm; not distinguished by the ancient Greeks, and whether they knew any Thing or not; our *Tania* of the first Kind, is, as I have already shewn, very uncertain. But which Kind was known to them, whether both, or one of them only, since they speak of the Kind they saw, as of one very long Worm. *Actuarius* says, in a Place before quoted, *one broad Worm is bred in the Gut, and Hip-*

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poocrates;

Hippocrates, That 'tis bred, as some other Worms are, while the Child is in the Womb, and that as the Child grows, the Worm increases till 'tis as long as the Intestines; and afterwards it continues to grow till 'tis expelled, either whole or in Pieces, and at last, when 'tis once broke, there are no Signs of it for a long Time; but in some Time after, says he, it grows again, ὡς ἐγένετο. I know the Translators turn these Greek Words thus, but afterwards they grow, in the plural Number, as if these Words had reference to the Signs, which Hippocrates spoke of just before; but 'tis improper and very wrong, since the Word ὡς ἐγένετο, ought rather to have relation to the Worm. And indeed this old Writer could mean nothing else, but that the broad Worm when 'twas broke, in Time should grow again, and that as much as was broke off, ought to be made up again; for otherwise, how should so many Pieces of such a Length, be broke off so often from one Worm, and it remain as long as before?

MOREOVER, we plainly gather from Hippocrates that this was but one Worm, because he affirms these Words, that it does not breed. And indeed round Worms do breed; but the broad do not, though some say they do. For a Man that hath a broad Worm excerns often with his Dung, something like Cucumber-seed, and there are some Men, who say this is the Offspring Brood of the Worm: But they who say so, do not say right in my Opinion; neither can so many be bred by one Creature, nor is there room in the Gut for them to breed up the brood. Aristotle seems to assert contrary, That the broad Worm breeds, and something like Gourd seed, as we have seen already. But Aristotle in the same Place asserts, That of the three Kinds of Worms, only two breeds; which Words I am not able by any Means to reconcile, unless this Philosopher took those Things which were excerned like Cucumbers

Feed, for the true Brood and Offspring of the broad Worm; and this is not really a Generation, but only an Excretion; and taking him in that Sense, he agrees with *Hippocrates*, about those Excretions before spoke of. Now *Aristotle* and *Hippocrates* in this entirely disagrees, when the one says, *the round Worms breed*, and the other, *that of three Kinds of Worms no other* (meaning the broad Worm) breeds; because, without doubt, he believed that these Insects, always proceeded from a putrid Matter, not by Generation, like other Creatures, of which Opinion more hereafter.

Now I return to that Question, wherein one Worm only or single *Tania*, is said to be found in the Bowels of Men, and which depends on the Question, whether the *Tania* breeds? For that hath so prevailed since *Hippocrates's* Time, that *Spi- elius*, *Sennertus*, *Andry*, and in short all the Moderns maintain this Opinion. But by what Argument they have supported it, I know not; for I see nothing, that is not contrary to this Opinion. First, who can think that so many Members, or long Pieces, as are seen so often voided, should be broken off from the Body of one *Tania*, without destroying that Insect? Secondly, As I grant that this *Tania* may live a long Time after the greatest Part of it is broke off, how can it be understood that it should generate, that those Members grow again, like a Vegetable, especially so long as to break off again and again? Or are they like the Tails of the Newt, which are said to grow again after they are cut or broke off? But here 'tis not only the Tail, but the greatest Part of the Body. Or that we may compare our *Tania*, to the Boughs of that infernal tree, that *primo avulso, non deficiat alter, aureus*, let them believe it that will, I shall not; for certainly these are very Trifles.

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But you say, 'tis as incredible, that so many *Tania* should be found together in the Guts, or that many Monsters of so great a Length should live together, as well for the Want of Room, as of Food, which, in this Case, must be presumed to be great. Now, that I may dissolve this Knot, I shall first say, That I am satisfied, if I certainly know the *Tania* to be a living Creature, as I have already shewn it is, that it is not a monstrous Thing for it to beget its like; neither shall *Aristotle's* Authority deter me, who denies that neither the broad Worm, round Worm, or *Ascarides*, and many other Insects beget their like, since Experience shews the contrary, as we shall find hereafter. But no Body can properly call this Animal monstrous, or a Monster, because it hath always been voided in the same Form, by many Men at divers Places and Times. Neither dare any one say this is a *Bastard*, unless he shews the Male and Female, its Parents, to be of different Kinds; and therefore if it generates its like, there will be many *Tania*. Though this is allow'd, I do not see how many of these *Tania* may be easily contain'd in the Guts, the Place assign'd them by Nature; yet I ought not to deny, that there are many, because there are Things we cannot account for, only I know this to be Truth.

But these Objections are not so great, but they may be answer'd. And first, what relates to *ἐνυχωρίων*, or *Space*, *Hippocrates* shews, that there is room enough to hold so many of this Kind of Worms. I answer, that the flat Form of the Worm seems very well adapted to the Place they are in, however so much bent or winding, since they are not only flat but very small, many of them may be in the Intestines, and sufficient Space and Room left to contain the Excrements and other Juices. Secondly, Though I say, that many *Tania* may lie in the Gut together,

together, yet I think it ought to follow thence, that there ought to be found as many of them as of other Worms. All Insects are not equally fruitful, neither do they all lay so many Thousands of Eggs; for the larger they are, the fewer they breed. So Snakes lay fewer Eggs by much than other smaller Insects: Therefore if I reckon our long *Tania* among those Insects that are not so fruitful, I think it will not be contrary to the Order or Laws of Nature.

As to the want of Aliment, which, upon the Plurality of *Tania* being allowed, may seem unavoidable to some, I shall not say these Insects are of the Kind *ὀλιγότρεφα*, or of little Eaters, as the Philosopher notes, since that common Rule does not seem to belong to the *Tania*, that horrible Monster. But cannot understand the *Tania* though many, should want Food in the Intestines, since there are several Juices, which are continually flowing in, with which these long and small Insects might assuage their Hunger. But are they fed with that precious Fluid the Chyle, designed for the Nourishment of the Man? First I answer, no Body knows what is agreeable with every Kind, or with what Plenty. Secondly, The *Tania* may be fed with the Chyle, without so much Detriment to the Man as is commonly thought. No Body will deny, that there is but little or no Difference between Chyle and Milk, yet a Woman who suckles Twins never wants Milk, and is rather better than at another Time; whence it follows, that there was Aliment sufficient and in plenty, for the Nurse and Children. Therefore if any one considers, what Chyle will supply some small, and those very voracious Worms, will find these Worms are not very hurtful: But when it happens, That the Hungry *Tania* consume all that Juice, as to defraud their Host of his necessary Aliment,

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then there ensues a *Canine Appetite*, reckoned by Authors among the Signs of the broad Worm; but from this Symptom we may conclude, there are more *Tania* than one only. Thence I gather this Case is very rare, and the Symptoms we speak of, ought not to be incerted with the perpetual Signs of the *Tania*, because none of those People which I have seen troubled with many of these, but have been so weakened by that Hunger or Leanness, as that while they lived they were mere Skeletons. Therefore I suspect that not only the Flower of the Chyle, as 'tis commonly thought, is consumed by our *Tania*, but that they may feed on the other Humours of the Guts, with which some of the cruder Chyle may be mixed. *Asclepiades* according to *Calius Aurelianus*, denies that the Excrements of the Belly are of another Nature, since from them the Bodies do encrease; and Lastly, by them some Creatures are nourished. Therefore if the Excrements of the Belly, which are the useless Remains of humane Food, is so loved by other living Creatures as Hogs and Dogs, that much better than Insects what other Food can those Insects have, who are bred and brought up in that Dung? And we may judge the same of other Insects. I do not but believe the *Teretes* are nourished by pure Chyle, but are fed on a watry or thicker Diet, such as proceed from Fruit, and with a Flegm or other excrementious Juices. And 'tis no ways absurd what the Learned think, that Children when they have eat a great deal of Fruit, and committed innumerable Errors in their Diet, and upon the overflowing of these Juices and Humours gathered in *αἰσθητικὰ*, may sometimes be eased by those Worms consuming those Juices. But whether Worms were ordained for this End, by the all-wise Creator, that they might for our Good, take away all the

obnoxious

obnoxious Food in our Intestines; or whether as *Vallisnerius's* Problem has it, they ought to be look'd on when they are troublesome, as a Punishment, as other Diseases are, or the Causes of Distempers; on this Argument we shall have Occasion to speak, when we treat of the Original of Worms.

As I shall not deny that Worms are the Cause of many Evils; I may observe, that Worms breed sometimes in great Numbers, in the Bowels of Children, not only without any Offence, but without any cruel or emergent Symptom. I remember I once open'd, by the Order of the Magistrates, a Boy and a Girl of six and seven Years of Age, killed by taking *Arsenick*, and found in the Intestines of them both, above an Hundred round Worms that were long, and some very long. One of these unhappy Children laboured under a double Tertian, but she seem'd very well, and at the Time they took the Poison were both playing together.

HOWEVER, our *Tania*, at whose Aspect every one trembles, does not always excite such Tragedies, as we shall see when we treat of its prognostick signs. It shall suffice me to observe by the Way, that harmless Worms are often accused, not only by Women, but by Physicians themselves; and that the Fevers and other Symptoms attending Worms, are often confounded with the Fevers and Diseases proceeding from those Worms. But now to return to the *Tania*, of which many may be contained in the Guts, whether we consider their Room or Space, if we regard the Plenty of the Aliment, sufficient to nourish these small Insects in humane Intestines, I now think to explain. Besides 'tis proved from *Tulpius*, that many are contained; for he asserts, that the whole Worm of this Kind, such as he describes, was voided three Times by the same Woman: Nei-

ther can I perswade my self, that any one will say, that those three *Tania* seen by *Tulpius*, succeeded one another, so that only one at a Time lived in this Woman's Intrails; they who deny there being many *Tania*, do not speak as if it was so, when they assert in express Words, that no one *Tania* succeeds another, that hath been expelled by Medicine. If any one, says *Hippocrates*, cures a Man that hath a broad Worm, and gives him a Medicine or Potion, if the Man was well prepared, it passes away rouled up round like a Ball, and the Man is well. *Actuarius* is somewhat plainer, and if this Beast that is so troublesome, hath once been voided, it never breeds again. With these *Spigelius* seems to agree in his tenth Chapter, whose Title is, *There are no more bred than one* (broad Worm) *neither is it observed to be twice bred*; though at the End of this Chapter he seems to hesitate.

MOREOVER, we must observe, that the Woman *Turpius* speaks of, voided some other Pieces of the *Tania*, besides the three whole living ones. The Wife of *Smethus*, says *Tulpius*, did not only void the Insect once or twice, but three Times, not only in Pieces but three Times whole and complete. From these Words I think we may gather, that the Pieces that were voided, were of a larger and older *Tania*, and those *Tania* that followed and were voided whole, and at separate Times were lesser and younger. And if the *Tania* be an Animal, as I have before intimated, 'tis necessary it should beget its Brood the lesser *Tania*. Besides *Tulpius*, who is a grave Author, and produces several Witnesses, and to whom I give very much Credit, though his Cut is not so accurate as I have already observed, he met with what very few have, viz. he saw these little *Tania* whole. However, there are allowed to be *Tania* larger and smaller.

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smaller, and older and younger, observed by me from their several Breadths. See *Tab. 7. Fig. 2 & 3.*

WITHOUT doubt the like Difference may be observed in the *Tania* of Dogs, as to their Size and Age. That which *Vallisnerius* saw and described, was not above a Span and an half long, wherefore I conclude it one of the lesser Sort, and so was the easier voided by Vomitting; but I have often seen Pieces of the *Tania* twice or thrice as long, hanging out at the *Podex* of a Dog and trailing on the Ground. The celebrated *Joh. Baptista Morgagni* in his Epistle, annexed to *Vallisnerius's* Work of the Original of Worms, says he found in the small Guts of a Dog he dissected, not one single one but a great Heap of them (great and small together). Now if there are many *Tania* in a Dog, why not in a Man, since the Kind is the same, as it will appear to them who compare the Description.

THESE Things being thus explained, it is easy for any one to understand, that many *Tania* are bred in a Man; for when this Insect is vexed and disturbed, no one Place is large enough, or any Aliment sufficient, besides all which Arguments for the Plurality of *Tania*, there is another brought from those Things treating of the great Age of that Worm in the next Chapter. Whereby it may be fully explain'd, how the Pieces of so many *Tania* are excerned, and from whence they may be supplied, and wherein consists the Difference between the single *Tania*, as to Size or Age. For when any of them, though they are never so many, have arrived to a certain Size, and is by Medicine expelled the Body, and drawn away by Pieces, the Parts of that Worm, if there be any remaining, decay and come away with the Excrements unknown to the patient; then the other *Tania* grows up, which when it hath come to the proper Size, and is troublesome

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blesome in the Guts, upon taking a proper Medicine, is voided by Pieces in the same Manner, and so forwards. And it may happen that some shorter Pieces of a long Worm, may break off from the *Tania*'s Body, and the Guest still remain behind, with that Part of his Body whereunto the Head is annexed; which Part I do not think increases or grows again, but remains in that State, till some other Pieces are broke off, or it all comes away as it is expelled. But what I contend for is, that when many *Tania*, not one single one, are in several Men labouring under that Worm, I would not have every one divided into many Worms, like the Chain of Gourd Worms, since our *Tania*, though long, is certainly but one Animal. I give therefore this Caution, least any one, as I have remarked, as usual, should confound it with the Link or Chain of Gourd Worms. In like Manner the Tail of the same *Tania*, which I saw, in my Opinion does not agree with those Worms, since this with the Head and other Things described by me, of which I make no mention, are peculiar only to one Animal. Among other Arguments by which 'tis the *Tania* of the second Sort is proved not to be one Animal, this is the most convincing Proof, viz. that this *Tania* may be divided easily into many Parts and Pieces, all which singly, are so many short Worms, *ὀλόκηροι*, or consisting of all their Parts or Members, and are all like one another, when they wander singly by themselves up and down, before they appear connected and join'd together in a Chain. I am certain no Body will try such a Thing, with the like Success, on our *Tania* of the first Kind, or ever shew that every one of its Joints or Nicks are single Worms, so like one another in every Respect, as to say of it as Morgagni said before of the Dog *Tania*; No Body was ever found to be so like one, or that he never found any Body

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which seem'd more to be one. Now if the Dog *Tania* be one individual Body, I don't see why ours, which is not much different from it, ought to be divided into many.



CHAP. XI.

How long the *Tania* lives. A Place of Hippocrates explained concerning the broad Worms growing old with the Man. A vain and useless Inquiry after the *Tania*, whether it is bred in the small Guts, or in the large. Also of the *Tania* found in a Woman's Womb.

TO that Question, how many *Tania* are in a Man, *Spigelius* adds another, viz. how long may this Worm live? The Life of this Worm, if we mind *Hippocrates* who will have it to be one Worm, is very long, since according to him, 'tis bred in the Child when in the Womb, and grows old with the Man, (not occasioning his Death) unless 'tis first wholly expelled by Medicines. This, if we take literally, *Petrus Salius* thinks to be very absurd, thinking that *Hippocrates* meant otherwise, viz. that the broad Worm grows old with the Patient, who, by the various Diseases and the Weakness that he endures, soon becomes old. But *Spigelius* opposing that Opinion of *Salius's*, who denies that old Age to be that Extremity of Life, which is brought on sooner by the Violence of Diseases, than the Law of Nature, for he thinks, that *ἐνναιαλὸς γινώσκων*, (to grow old) we must understand a proper Age, prescribed by Nature at such a Term

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Term of Years. We may easily see, what Pains to no Purpose, some learned Men take to pervert the Sense of this clear Place; for if we examine and consider this Matter with Attention, 'tis possible we may find a Man who was old and voided these Worms, both when he was a Youth and when a Man. Certainly these Insects grew old in that old Man I have already spoke of, who for ten Years together voided the broad Worm; though when he was young he never felt them, but after he was Fifty he began to be troubled with them, and remain'd with him to his last Breath; and so far by this Example is *Hippocrates's* Observation confirm'd who was mistaken in this only, that he imputed those Things only to one, which belonged to many that succeeded one another. And since the Life of some Insects is short, this Opinion might seem absurd to *Salvus* and *Spigelius*, that the broad Worm is said to be born and grow old with the Man, as if that Insect lived as long as a Man. Therefore these learned Men not digesting this great Age of the broad Worm, endeavour'd to wrest *Hippocrates's* Words in another Sense; which was unnecessary if they had understood, what this old Author would have had them understood of one, was of many; but they were both led into the same Error with him about the Unity of the broad Worm.

BESIDES, 'tis certain from Experience, and the Truth of *Hippocrates's* Observation, that *those Worms do sometimes grow old with a Man; that is, a Man who is troubled with this kind of Worm is old for many Years, and is much disordered by it, neither are we less certain of the Shortness of the Life of all Insects, and this is no slender Argument against this Worm's being a single one.

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THUS much for that Place of *Hippocrates's*, about the broad Worm's growing old with the Man, and those learned Men's Mistake in this Matter. But to the Question started in the beginning, how long that Species of Worms may live, or whether it is swifelier than others, *Spigelius* answers, *That this Worm* (though in his twelfth Chapter he denies it bred in a Child) *is observed to live longer in a Man, than any other kind of Insects or exanguious Animals ; and since Cardanus hath writ that Bees live twelve Years, the broad Worm hath been observed to exceed that Age, as in the Wife of the Switzer, of which I have mentioned before.* But to lay aside *Cardanus's* Story of the long Life of Bees, we shall observe the great Age of the *Tenia*, *Spigelius* speaks of, on which ground alone he endeavours to shew, that there is but one bred in a Man ; which we have already shewn to be false. Therefore if there can be many in the *Intestines* of a Man at once, the Question ought to concern the long Life of them all, as they succeed one another, so that *Spig lius's* Arguments signify nothing. The Duration of many Insects indeed is short, especially those who are first Worms, and after become volant ; but those who retain their Form of Worms, are more long-lived ; as for Example the Earth-worm. But as the round Worms in Men were more uncertain, though I do not think they are long lived, because they may often be destroyed by the sharp Juices they contain, besides the many thousands of Eggs we find in them, are an Argument that great Numbers of them perish daily, for otherwise there would not be room in the Guts to hold them. Yet some of them may live a Year or longer, and there is no doubt or something longer, is the Term of the Life of our *Tenia*, so that at least they were a Year old, as we have shewn in the foregoing Chapter, whose pieces were wont to be excern'd every Year ; but these

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these are mere Conjectures. It remains that we should enquire, whether the broad Worm is born with the Child, but of this more properly hereafter.

SPIGELIUS enquires further, *Whether the small Guts or the large are the Place of the broad Worms Generation?* and concludes it to be in the small, though almost all Physicians judge it to be in the large and chiefly in the *Colon*. I shall here consider both their Reasons, though the Question is of little Moment and in its self doubtful. It appears from the Observations of *Tyssen* and *Morgagni*, that this Kind of Worm was found in the small Guts of a Dog. They who believe that these Worms raise their Head up even to the *Pylorus*, to consume the Chyle as it falls out of the *Stomach*; have not denied that the small Guts are possessed by them, and we have said in the former Chapters, what we should think of this Opinion; for we must not deny that the small Guts of Men have sometimes those Worms, since frequently they cause a gnawing or tickling at the Pit of the *Stomach*. But from thence it does not follow, that they are rather bred in the small Guts than the large, unless we believed that the Valves of the *Colon* and *Ileon* hinder those bred in the lower Guts from any higher Ascent.

BUT first, what *Gabrielis Numelbergius* relates of a *Tænia*, that came away from the Womb of a Woman, ought to be looked on as a Rarity. When *Ætius* was, says he, on the upper Rhine, I often saw *Tænia* of a prodigious Length; the first was one voided from the Intestines of a Woman, then afterwards two voided by a Child; and Thirdly, some that came from the Womb of a Woman or its Dirt, heap'd together, as she positively affirmed. What this Author writes, came from the Woman, who might perhaps be deceiv'd her self or had a Mind to deceive others. But whether this

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Woman spoke true, or the *Tania* had crept out from his Intestines into her Womb, or whether it was bred in the Womb, I know not. Authors certainly affirm, that there are other Worms, not only of this Kind which are found in the Womb, as we shall see in the thirteenth Chapter.



C H A P. XII.

Of the Diagnostick and Prognostick Signs of both the *Tænia*.

S *PIGELIUS* treating of the Diagnostick Signs of the *Tænia*, in the first Place reckons with *Hippocrates* and the other Ancients, the Excretions like Gourd-seed; and asserts, that this is the proper Token, where we always knew this Worm is in our Belly; but the other are the same with those of the *Teretes* or round Worms. But this Sign with many others only belongs to the *Bacard Tænia*, or Chain of Gourd Worms.

BUT among other Signs, the canine Appetite hath not the lowest Rank, says the same Author, commending *Ætius* who says, a continual Hunger is a Sign of the broad Worm. So *Trallianus* already quoted, asserts such a Worm was voided by a Woman, who, when she had eat very immoderately and digested it all, said she should never be satisfied. But that Hunger as I remarked when we treated of that Third, where- by the *Tænia* may be freed in a Man's Intestines, ought not always to be reckoned among the certain Signs of the broad Worm. For none of those, who

I were

were troubled with the broad Worm, that I saw ever laboured under a *canine Appetite*, or ever died with a Leanness, but many of them pretty fat and well to look at, which is contrary to the other Observation of *Aetius*, wherein he says, *they who have that Worm are attended with a Leanness and Weakness of the Body with Sloth*. Now these Signs might be laid down by *Aetius* and *Trallianus*, and not by *Panthot* in his Account, of *Augenius* and others, since these Signs are met with in some, who have many of these Worms, or voracious ones, but that those Signs are not lasting and Pathognomonick, appears from what has been said. For how can Hunger be a lasting Sign of the broad Worm, since *Spigelius* notes a *Dejection of Appetite*, the contrary Effect is sometimes added to those Signs; therefore all these Things are equivocal.

BUT let us take Notice of his Relation of a German Woman who voided, as we have already heard, several Pieces of the *Tania*, for therein are contained many other Signs of that Worm. 'That German Woman, says *Spigelius*, who was delivered at Padua in December 1607. of a healthful strong Boy, had a very difficult Labour, not so much because it was her first, as that the Child was large. All that Time she was with Child she was very well, eat heartily, without any nauseating or loathing of Meat, slept well and went about her Household Affairs with Alacrity. But after she was delivered, she began to loath Wine, and loved to drink Water, slept not at Nights, grew weary with every little Motion, was sometimes taken with a feverish Burning and Head-ach at Nights and felt a bearing down and Weight, along with Gripings in her Belly; sometimes through the *Abdomen*, often about the Navel, frequently on one Side, and frequently on the other. About five Months

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Months after she grew lean, her Eyes shining and bright, and her Face and Body of a florid Colour; her Fever came upon her oftner than before, sometimes every Day, sometimes every three, four, or five Days, whereupon she was often obliged to keep her Bed; but as she perceived nothing besides this grumbling in her Belly, and the Swelling with some gentle Gripings, she thought she was with Child again, and four Months gone. One Night in August following, which was eight Months after her Delivery, about half an Hour after Supper, wherein she had eat some Lettice with Oil and Vinegar, she was taken with a Chilness and a Fever, with great Pains in her Belly; to mitigate which, when she feared her Belly would burst and break, she pressed both Sides of her Belly with her Hands; she attributed these Pains to the *Menses*, which were then on her, and had since her lying-in, flow'd at their proper Periods in great Quantities, by Reason of the Plenty of Blood, though at the same Time the Boy suck'd. But being then taken with a Looseness, in which she voided a watry bileous Matter, a Piece of a broad Worm thrust out at her *Anus*. Her Sister who began to be frightned, not knowing what it was that hung out, takes the Piece in her Hand, and draws it out five Cubits in Length; but fearing it was a Piece of a Gut, which it resembled, she was drawing out, she divided with her Nails this Worm, whose Part that hung out drew up into the Belly again, and the other she flung on a Stone, winding it self up into many Rings; but afterwards taking it up alive with a Stick, she cast it into Water, where forming it self into a Circle it died. When the Husband came and heard how it was, he sent for me. As soon as I came, I ask'd her what she had endured before?

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She told me, besides what I have already men-
 tioned, that three Years before, when she was a
 Maid, she was very ill, and had voided often
 round Worms; that she was sometimes troubled
 with Pains in her Belly, with a Chilness and Fe-
 ver ensuing, that she loved to drink cold Water
 Vinegar or sour Milk, and all four Things, that she
 seldom relished Flesh or Wine, and from a Child
 she used not to eat Bread with her Meat; that her
 elder Sister when she was a Maid, and about
 seventeen, laboured under the broad Worm for two
 Years, till at last she was emaciated, and in
 kind of Dropsy, when she voided with cruel Pain
 in her Belly a broad Worm, but after marryin
 was very well, but had no Children. Moreover
 she added, that at Nights she was very heavy
 that she was easier when she lay on her Face than
 on her Back; if she reclined on either Side, her
 Pain was moderate, especially more on the left
 than on the right Side, attended with a heavy
 Weight, which she was perswaded, might proceed
 from the Child's moving and changing its Situa-
 tion. After this Account of her's, I resolved to
 consider more curiously what should afterwards
 happen; the next Day the *Menses* flowed plen-
 fully, and for some Times she was taken with
 a Fever every other Day, which came upon her
 about Night; she felt frequent grinding Pains, but
 none any acute ones, on the left Side of her Belly
 which reach'd to her Back, and hinder'd her from
 sitting; she voided by Stool every Day, or every
 other Day, a great Quantity of a watry Matter
 which caused an Itching and Heat at her Fundus
 ment. This was always expected, when a Child
 is ill, Horror, and a Fever had preceded with
 great Gripings and Motion; which (N.B.) may be
 a Noise like a Fish swimming, shaking or striking

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Water with its Tail, or a Bladder filled with Water and Wind, and then shaken hard; besides, this Sound was so plain as to be perceived a great way off. Whatever she eat or drank, she was tormented with cruel Pains about her Belly, whether she drank Wine or Water, or whatever Flesh, Eggs, or Fruits she eat, of which she was a great Lover, but particularly Melons, which caused such cruel Pains, that she was forced to abstain from them. The Swelling of the Belly sometimes presaged a Dropsy; but it was very uncertain, sometimes greater and lesser, and sometimes none at all; she had oftentimes a Dimness about her Eyes, a Giddiness in her Head, and a Tingling in her Ears, besides a continual Lassitude whether she was standing, working, or in Bed. She had a continual Thirst upon her, and more desirous of Water than Wine, but most of these Signs came upon her more at Night than Day-time. Her Milk fell off so much, that she had been forced to wean the Child, had I not restored it by proper Remedies, which check'd the Violence and raging of the Worms; whereupon the Worm growing weaker and the Swelling abated, the Patient gather'd Strength, and two Years after conceived again. At which Time I went to see her, but observed nothing in her Excrement like Gourd-seed, only a Piece of the Worm, which I bid the Maid-Servant bring to me in a Basen of Water, that I might show it to Students in Physick. Therefore when the Author of the *Fourth Book of Diseases*, and other ancient Writers say, That they who labour under the *Tania*, excern together, with their Excrement frequently something like Cucumber-seed; they do not mean, that what comes separately, should exactly resemble one single Seed of the Cucumber, but that a Piece of the Worm which hath broke
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off, sometimes comes away with the Excrement
 in the middle of which Piece there are little Joints
 included within a broad Membrane, which may
 singly be compared to, since their Form and
 Disposition is alike, one single Seed of the Ca-
 mber, or many of them to many Seeds cut o-
 nick'd long-ways and a-cross. And as I have
 said above, That this Woman fancied she was with
 Child, I shall speak of such a Case, which happen-
 ed to a Virgin of *Austria* of a Noble Family
 This Maid, when her Belly had swell'd for some
 Months and the *Menses* ceased, and she loathed
 some Meats, and eat of others with an unusual Ap-
 petite and Desire, was thought to be with Child
 Her Friends and Relations, being angry with her
 for this Disgrace, (for by all the Physicians and
 Midwives they consulted with, she was thought to
 be with Child) neglected her Cure, that being ema-
 ciated, she died. After her Death her Body was
 inspected, and there was found in her Intestines
Tania, with a great Quantity of Water, thought
 to be the Cause of her Death.

THUS *Spigelius* abounds with Symptoms, which
 he thought belonged to the broad Worm, of the
 German Woman : But I shall presently shew, that these
 were all equivocal, only those *Motions* of the Belly
 which made a Noise like a Fish swimming and striking
 the Water with its Tail, must be allowed, if it was
 so, to be a proper and Pathognomick Sign; the same
 Author adds, that this Sound was so great, that it might
 easily be perceived a great way off. But I fancy this was
 a *Borborignus*, and those who labour under it, are not
 always troubled with Worms; also the comparison
 of this Sound, with the Noise made by a Fish
 striking the Water with its Tail, might proceed
 from the Woman's Imagination, and who had voided
 before a *Tania*, and who thought it moved

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er Belly like a Fish: And these following Words of *Spigelius* seem to signify, that it was a *Borborygmos*, or a Bladder filled with Water and Wind, and when shaken hard, for this Sound is nothing like the Noise of Fishes swimming. Yet this Author thought this to be so certain a Sign, that he hath maintain'd the Motion and Life of that *Tænia* against other Physicians, who deny it to be an Animal or living Creature; I can affirm, says this Author in his seventh Chapter, *That I have sometimes heard the Tænia making a Noise in the Patient's Belly, like a Fish leaping and rolling in the Water, and upon laying my Hand on the Belly, have felt it stir like a Child in the Womb.*

HOWEVER, it is not only *Spigelius* speaks, of the evident Motion of this Worm in the Intestines; but *Philibertus Saracenus* in his Epistle to *Fabricius*, reckons the Motion among other Symptoms of the *Tænia*.

THE Observations of Physicians testify that these Symptoms are rather more severe in the round Worms. And *Spigelius* himself, who admits of no other Sign proper to the broad Worm, besides those Excretions like Cucumber-seed, which I have already shewed to be so, pronounces all the other Indications and Signs to be common both to round and broad Worms.

It plainly appears then, how uncertain and unfaithful the Diagnostick Signs of the *Tænia* are, if these Symptoms he mentions, are common to many other Diseases: Besides, many of those Symptoms *Spigelius* describes, seem to be mere Conjectures. There is no greater Opposition and Diversity of Tokens in any Disease, than is here observed. If we consult *Fabricius*, a Pain and Gripings of the Belly, a Weakness of the Stomach, a Nauseating and Vomitations, with the loathing of Meat, were the only

Signs of the *Tania* in *Barba Rostin*. Now if loathing of Meat was here troublesome, certainly there was no canine Appetite, a Sign much spoke of by the Ancients, of which we have already, and shall hereafter treat, when we speak of the Signs of both the *Tania*. ' *Judith Mace*, says *Fabricius*, was very much troubled from her Childhood, with a Palpitation of her Heart, a Weakness of her Stomach, and an Obstruction of the *Viscera*. Whereupon she had, by the Advice of several Physicians, taken several Medicines, and sometimes by a Purge had voided very long Pieces of Worms by Stool. But afterwards, when she married and began to breed, that Tremor of the Heart left her, her Colour became fresher and livelier in her Face, but she had had a continual Looseness upon her; and voided at Intervals Pieces of Worms, sometimes five, sometimes nine and ten Spans long. But as often as she voided these Pieces, she easily perceived their Eruption in her Intestines: Notwithstanding she bore many Children, and most Boys, many of which are still living. One Day, when she had taken a Purge, she voided a Piece of a Worm seven Ells long, which Ell is six Spans; and some Days afterwards, the greatest Part of that Worm; and without being sensible of the Eruption as before. Wherefore she thought she was altogether freed from that Worm, neither was she deceived; for from that Time hitherto, she had no such Thing: Also her Looseness, which was always upon her, ceased, and for these eighteen Years, she has been very well. This I had from her Husband in her Presence; and they both said that if all the Pieces she had voided, were joyned together they would have made about twenty Ells.

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THUS far *Fabricius*; but 'tis worth Observation, That that Woman though she nourished the broad Worm in her Bowels, was pregnant and had many Children which lived, whereas the other Woman spoke of by *Saracenus*, though she was fruitful, yet the Children died young. The Woman *Spigelius* gives an Account of, had Children which lived, but her Sister, who was troubled likewise with the broad Worm, was barren. Hence we may learn, That neither the Sterility of that Woman, nor the Death of those Children in *Saracenus*, might certainly be imputed to our *Tenia*. For as this Worm does occasion Barrenness, so it doth not always cause Abortion, tho' that first German Woman of *Spigelius's* brought forth a healthful Boy at his due Time; neither can the *Tenia* be said to consume the Nurse's Milk, when that Woman who suckled her Child never wanted Milk.

TO these two Relations *Fabricius* adds two more, whereby he shews that the Signs indicating the *Tenia*, are not so many as those already noted, but more gentle and less severe. I was called, says *Fabricius*, To a Woman who thought she was with Child; she said, she felt something cold and troublesome about the Region of her Navel, and the Bottom of her Belly; and likewise complained of a Pain in her Head, for which I gave her some Pills, by which she was well purged. She voided also a Piece of a Worm nine Spans long, and was afterwards very well. A Servant-maid, continues our Author, who was in the thirtieth Year of her Age, was troubled for many Years with this kind of broad and long Worms, and had been used for many Years, to void some Pieces about the Feast of St. John the Baptist, as she had the Year before at the usual time, which was 1607. I was shewn three of those Pieces which were voided by this Maid, and which were six Ells long. The Maid always said before, that she felt something cold and trou-

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blesome in her Belly; she often laboured under a Looseness and was sometimes bound; yet as she was robust and strong, she received but little Harm from this Disease. Thus Fabricius. So another Maid (according to Wickersus, of his own Observations) who was in good Health, and doing her Business, voided a Worm fourteen Feet long. I could produce many more Examples, of the Symptoms observed in other Persons who discern'd the *Tania*, but these shall suffice.

WHAT I observed in that old Man, who voided the *Tania* with the Tail, I have before related, where we treated of the Description of that Worm, and he, as well as these Women, perform'd all the necessary Duties of Life; for the ten Years he voided those Pieces of the *Tania*, he was robust and of a middle Size, and went about with Ease and Alacrity, neither was he ever compelled to keep his Bed on this Account but for one Day. The Indications which were troublesome once or twice a Year, were only an heavy obtuse Pain, a little gnawing at the Mouth of the Stomach, which might more properly be called a Tickling. His Stools were for the most Part loose, but he did not labour under a real Diarrhea and Looseness, such as *Judith Mace*. I shall presently enquire, whether the Apoplexy which carried him off, might be imputed to the same Worm. But I have seen some others, who have been more troubled with this Insect, which hath tormented them oftentimes with Pains of the Belly and Cholick Gripings and Twitchings; and if there be any other Symptoms besides these, they may be reckoned among the equivocal Signs.

THIS is all concerning the Diagnostick Signs of our *Tenia* of the first kind; And I think I may say that none of these are Pathognomick or perpetual or which are not common to other Diseases; so that the only and certain Sign of that Worm, is its com-

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ing away, since all the rest are common either to the round Worms, or to other Distempers.

I think those Signs which indicate the Gourd-worm, are not very much different from these we have rehearsed, such as *the gnawing of the Guts and Cholick-Pain*, which were the Symptoms on the *Hebrew Woman*, *Valisnerius* spoke off. Besides, that Author observes of that Kind, that those Worms are not so troublesome when they are united together, as when, as I may say, they live separate and single; because when they are single, every one may bellicate and pinch the Guts, but when they are join'd, they are in a Manner bridled. The Maid-servant which I saw, had as I have already said, those Symptoms upon her; she was Pale, but otherwise very well to pass, in the twenty-fifth Year of her Age, and her *Menses* flow'd at their due Times, but slowly. She said, these Worms were more uneasy to her in Autumn and Winter than in the Summer, that she never, or very seldom, neglected her Business for them, though she was more slow at the Time she endured those bitter Pains. But I dare not determine, whether those Pains torment those who are troubled with this kind of Worm more cruelly or more frequently, or whether, as 'tis observed of the other, they are very gentle or none at all, since we have not many Examples of it. Also this Maid denied, that she was ever *hungry* or *greedy*, but affirm'd that she sometimes hated Meat; neither is *Valisnerius's Jew Woman* said, to be desirous of Meat. The following Observation of *Horatius Augenus* testifies, that an immoderate Hunger is in some sick Persons, a Symptom of the Gourd-worms. A Citizen of ours, (*says Augenus in his 6th Book 33d Epistle to Franciscus Sanctius the Physician*) of a good Constitution, full of Blood, began in the 26th Year of his Age to grow very hungry: His Hunger

' Hunger encreased upon him every Day, so that he
 ' became unsatiable; and though he lived very
 ' sumptuously and eat much, yet would he rise from
 ' the Table never satisfied, but was obliged every
 ' Hour or two after a Meal to eat again; neither
 ' did he ever vomit up his Viſuals, nor had a Loofe-
 ' neſs on him; but on the contrary, became every
 ' Day dryer. He conſulted with theſe eminent and
 ' learned Phyſicians, *Lucianus Belus*, Phyſician to
 ' the Duke of *Urbini*, and *Heracles Brancutus*, who
 ' when they had done all they could, thinking that
 ' it was a Canine Appetite, occaſioned by the cold-
 ' neſs of the Mouth of the Stomach; and as one
 ' of them ſaid, from the Flux of the Melancholy
 ' Juices into the Stomach, could not cure him.
 ' They called in me, who lived and practiſed Phyſic
 ' ſick at the Mountains of *Picenum*; and I came wil-
 ' lingly, thinking I might ſee ſomething worth No-
 ' tice, and indeed I thought not amiſs; for as ſoon
 ' as I came, I ſaw the Patient not only eating but
 ' devouring, that I was amazed. And about two
 ' Hours after Dinner he was hungry again, ſo that
 ' he was obliged to eat or faint. I remarked alſo
 ' thoſe Things that were Natural and Preter-natural
 ' in this ſick Perſon; and conſidering them all dili-
 ' gently, I was thereupon perſwaded, that the Cauſe
 ' of this Hunger was not diſcovered. *Belus* came
 ' again the next Day, with whom diſcourſing about
 ' this Caſe, I told him, that there was no Coldneſs
 ' of the Mouth of the Stomach, no Flux of natural
 ' Melancholy to the Stomach, but that I ſuſpected
 ' 'twas a Gourd-worm, which devoured all the Alimen-
 ' t, that was the Cauſe. At firſt, he and his
 ' Colleague began to contradict me, but I demon-
 ' ſtrated to them, and thoſe who were at this Con-
 ' ſultation, by theſe Arguments, that my Opinion
 ' was not only probable, but neceſſary. Firſt I ſaid

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if there was a cold Disposition of the Mouth of the Stomach, there would be a slow Digestion; but there was no Sign of any such Thing; for a loose Stool proceeds from the Aliment's not being digested, and the Excrements of our Patient are dry. Secondly, There would be a Sense of that Coldness, but here he felt none. Thirdly, There would be sour Belchings and breaking of Wind and vomiting up the Food, as it is with Dogs, none of which Signs are in the Patient. Moreover, these Signs shew that there is no Plenty of flegmatick or melancholy Humours, because an Appetite proceeds from sharp Humours, but this Sourness would easily be perceived by the Eructations; and there can be no Plenty of these Humour, without a Weight on the affected Part. Lastly, His Complexion, shews he is not Melancholy; for he is neither slender nor thick, neither of a black or pale white Colour, but as I may say, of a square made Body. By these Reasons, I thought this Hunger was occasioned neither by a cold Disposition, nor Melancholy; but at last laid down those Conjectures which induced me to think this Hunger was caused by this kind of Worm. For since this immoderate Appetite did not, (as they both agreed) proceed from an hot Disposition of the whole Body, nor from a Weakness of the retentive Faculty, neither from a cold Disposition and Melancholy, as I have already shewn, it remains that we admit this last Cause from the common Consent of all. The sick Man said he felt something stir in the Bottom of his Belly, like a Hand stretched out to his Stomach, and taking away all his Food; and his Father told us, that when he was a Boy he was much troubled with Worms, and when he was about seventeen Years old, he remember'd he voided above twenty Worms
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rolled up in an Heap. *Brancutus* satisfied with
 these Reasons came over; but *Belus* would neither
 agree or disagree, saying, he had never met with
 such a Case before. In short, the sick Man was
 left to the Care of *Brancutus* and my self, in the
 Cure of whom we have had good Success, after
 this Manner. First of all, I gave him five Hours
 before Dinner, a Pint and an half of Oil of Sweet-
 almonds, to loosen and soften the Belly, and so
 prepare it for the voiding of the Worm: But that
 I might excite a Vomiting, to which he had before
 been used, I gave it him at four Times, bidding
 him take his proportion'd Draught every ten Mi-
 nutes. A little before Dinner, I gave him two
 Bolusses of a Dram of the Species *Hieræ*, and a
 Scruple of Rhubarb, and bid him drink immediate-
 ly after it, six Ounces of the Decoction of *Sebe-
 stens*: I prepared him a liquid but sharp Food,
 which was bread crumb'd in Chicken-broth, with
 three Ounces of the Juice of Limons. After
 this his Hunger began to abate; neither did he
 eat for two Hours after; hence, not only he, but
 every Body else began to hope, especially because,
 he had remain'd six Hours after Dinner, without
 any Appetite. Before Supper I order'd him a Cly-
 ster of two Pints of Goat's-Milk, and gave him
 a Dram and an half of the Pills of unwash'd
 Aloes, with the same Quantity of the Decoction
 and dissolved in the crumb'd Bread ten bitter Al-
 monds. In the Night he had a soft Stool, his Ex-
 crement was Flegmatick and Slimy and of an
 Ash Colour.

I repeated the same Remedies the next Day
 and at Supper he had no Hunger upon him, but
 seem'd rather to nauseate. In the Middle of the
 Night he was loose, and felt something come a-
 way solid; and touching it, he thought it was a

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Piece of his Guts, whereupon crying out, he order'd them about him to fetch me. When I came, he said he should die presently, unless he was assisted; for his Guts were coming out. I saw the Gourd-worm, and laughing at him, bid him be of good Cheer, for he would be well, and told him, that his Guts were not coming away, but it was that Worm which was the Cause of his unsatiable Hunger, and had devoured all his Food. It moved and lived, and was the Length of five and twenty Cubits, and the Breadth of a little Finger; there were above a thousand Gourd-worms sticking to that *Mucus* or Membrane, which lived almost an Hour. Thus he recovered to the Admiration of the Assistants, and the Honour of our Profession. I saw such a Worm the Year before, at *Franciscus Vercellensis*, but not so long; for it was but ten Cubits, and was voided dead: but I did not know, nor said before, that he labour'd under this Disease. For he labour'd under a spurious Tertian, and after several Repetitions of Purges taking at last the *Pilula aggregativa*, he voided this kind of Worm. But how Worms are bred, and whether the Gourd-worm is one single Worm, or many sticking and cleaving together by the *Mucus*, and how we may cure them, hath been already shewn us in the *Treatise of Worms*.

Thus far *Augenius*, of whom I have already taken Notice in the fourth Chapter, when I treated of the Description of the Gourd-worm. We must observe, that in the Relation to the Signs, that unsatiable Hunger, was not so troublesome to the second Man, *Augenius* speaks of, as the first; from whence we may infer, that this Symptom happens not always, to all Persons who have the Gourd-Worm. Therefore the Signs will be almost the same in this kind of Worm, as in the former. Now the only sure Token we can

can trust to, is the Worm it self, that is sometimes loose and thrust out at the Belly, so as to produce those Excretions like Gourd-seed, which as they are many Gourd-worms; are not to be found in the other kind, as I have already made it evident; and when rejoined to others, make that *Bastard Tania*, or *Tania* of the second Kind. But while I am speaking of this Sign, I ought not to pass by those Things, told me by the Maid-servant I mention'd, viz. that she did not excrete those Gourd-worms mix'd or defil'd with her Excrements, but that many of them came singly out at her *Anus*, though at that Time, she had no Desire to go to Stool. So *Fernelius*, (See Chapter IV.) observed that the *Ascarides* came from the *Anus* with an Itching, and thence crept up and down the *Buttocks* and *Thighs*. But I know not, whether the same Thing hath been observed, by any of the more modern Physicians; though *Serapion*, whom I have quoted in the second Chapter, teaches that both Kinds easily come away.

BUT I see or hear of none, who have read of the solitary Worm of its own Species alone; or as I may say, that Serpentine one of two hundred Foot long, so very voracious, and which when any Piece broke off grows again, and such other Things among Authors. I say I see none, who say any Thing of its prognostick Signs. And if we consider the Things, have we not every Day before our Eyes some very fierce Monsters celebrated in Story, the *Chimera* of the three bodied *Bellerophon*, *Perseus* the frightful and dreadful Dragon, and some Things more terrible. And Lastly, if we come to some more modern Story Writers, that Whale with *Arcturion*, which swallows Men like Pills.

BUT our *Tania* however long it is, and horrible its Name, hath not such sad Consequences. For we recollect the abovemention'd Accounts of the Persons

persons, within whose Bowels this Insect hath lived many Years, we shall hardly find any of these indicated by the Symptoms, which might certainly be imputed to that Worm. The old Man whom I have already spoke of, to have excern'd *Tania* often for long Time, being taken with a Stupefaction, died in the sixty-sixth Year of his Age; but it does not appear, that they were the Cause of this Disease. *Hippocrates* observes, *the Voice to be intercepted*, in those who certainly have the broad Worm; and Physicians inform us, that those who are troubled with any kind of Worms, are infested with Cramps, the Epilepsy, and other nervous Affections, as of the Hand, Brain, and among others with an heavy *Cataphora*. But as nothing is more common than a Mistake in Physick, which Philosophers observe to be taken *on Causa pro Causa*, let us take care lest we do not likewise err in the Case laid down.

BESIDES the Fate of that old Man's Mother and Aunt, who both died of the same Distemper, without ever voiding any Worms, removes all Doubts. And if we consider the other Symptoms before reckoned up, and which might very well be imputed to that Worm, we must own that none of them, were of themselves deadly, but that many of them were small and trifling in those who were affected with this Disease. Therefore *Hippocrates* said right, that a Man who has a broad Worm, *aliquid grave tamen contingere*.

By this Prognostick, the other Question seems likewise to be resolved, *which kind of Worms*, meaning the broad and round, *produce the most dreadful Symptoms*? *Celsus* and *Avicenna* pronounce the broad Worms to be the worst; but as it appears from *Hippocrates's* Observation, that the broad never occasion Death, which is contrary to what most Authors say of the round Worm, this seems repugnant to Experience,

and the Examples produced. Neither do I think that there is the most deadly Symptom, which is deduced from the broad, but may sometimes be ascribed to the round Worms; but since, some Physicians have lately observed, that the round Worms do not pierce and dig in the Guts, I shall quote Schenhammer on this Subject: 'Many Authors of Worms and Credit have declared, says this Author (*Miscell. Curios. Decad. 2. Ann. 5. Obs. 10.*) so that we cannot Doubt of the Truth on it, that Worms do often break out at the Navel and Groin. But *Fel. Platerus*, unless I am mistaken, was the first who began to doubt, whether they came forth of the Intestines they perforated, alledging that they have neither a sharp Bill nor Teeth, and cannot consume and break their Tunicks, and so make themselves a Passage by Sucking. Wherefore thinking, that when an Imposthume is made under the Skin at their outward Seats, they breed from the Putrefaction, he ventures to inform us, that they are not Worms, but only like such Worms as are bred in Ulcers.

At first Sight I confess, this Thing seem'd very difficult, if any one would have demonstrated against him, that they came forth of the Intestines: Or that they might seem to creep out at the Groin or Navel; for since 'tis not easy to perforate the *Peritonæum*, the Muscles, the *Pannus adiposus*, and the Skin it self, this Doubt seems not deniable. But what he adds, that they are not Worms daily experience confutes; though the Worms are not seen to come out, yet when there is an Exulceration they cannot be thought absent though they penetrate the Imposthume, from the external Parts to the Intestines, and upon a Fistula's arising, do not make themselves any other way, but one, by which they come forth

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as it appears from some Examples of Schenkius and others.

BUT whatever this is, I rather think, the Imposthume proceeded from the Worms creeping out of the Intestines, into the fleshy Parts, and by their gnawings, raising Inflammations, and hollowing the Part, than that those Worms came out by the Fistula, which followed the Imposthume; and what convinces me is this Observation: A Country Woman of about forty-six Years of Age, endured a great Pain in her Belly for a long Time. Her Neighbours and some Women who were her Friends, as it happened, came to see her, and thinking she had the Cholick, gave her something to ease her; which she refused to take for some time, alledging that she never was afflicted with that Distemper: Neither was her Pain relieved by what they gave her. Not long after, she perceived a Swelling in her Groin towards the Thigh, which in a few Days Time began to grow red, and also from thence to her Knee, there appeared to be an Inflammation in a direct Line, and three Inches broad. And this Tumour by Degrees growing black, the Women were afraid of a Gangrene; and finding that the Muscles and Tendons grew stiff, and that when ever the Woman stirr'd, she was in great Pain, apply'd some Emollients. By these Means the Imposthume broke, from which there flowed a *fetid Pus*, and afterwards four and twenty Worms, some small, and some the length of a quarter and half of an Ell, began to come away two or three in a Day, for eight Days. They were all alive, but some came with their Heads first, others with the middle part of their Body, and were drawn out very cautiously by the sick Woman.

AFTER

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' AFTER this, these Women consulted together to
 ' give her some Oil of Olives to drink, to cleanse
 ' and heal the Sore; which Oil soon after she
 ' had drunk it, flowed out again at the Ulcer; by
 ' which Sign it plainly appeared, that the Gums
 ' were perforated. The Sore remained yet open
 ' and there flow'd from it daily, a thin yellow Serum
 ' free from any Stench and in such Plenty, as to reach
 ' down to the Bottom of the Foot. This Woman was
 ' under several Mountebanks Hands, who closed the
 ' Wound; but then the Woman was in great Pain again
 ' till at last the Matter gather'd and broke out again.
 ' AFTER two Years, she was taken with an inter-
 ' mitting Fever, and then it closed of its self; but when
 ' the Fever became violent, and she had taken several
 ' Remedies, such as Country Folks use, and the Fever
 ' never abated, the *Fistula* broke open again, and
 ' remains to this Day, which is now eight Years
 ' from the first beginning of this Distemper. The
 ' Hole or Passage was not so large as a Wheat-straw
 ' from which sometimes Worms came out, some large
 ' and others as small as a Thread. No Pain, but
 ' only an inward Tickling preceeded their coming
 ' away. She perform'd all her Domestick Affairs
 ' but was forced to abstain from all other Work
 ' which require a more violent Motion and bending
 ' of the Body.

' BUT being solicitous about Chylification,
 ' ask'd the Woman, what Consistence that Matter
 ' was of? She answer'd, that she had observed
 ' that all the other Things she took, besides the
 ' as Garlick, which hath a strong Smell, and
 ' Cabbage, turn'd to a dark brown Colour, but when
 ' Meats of Milk, &c. to a whitish Colour. Then
 ' asking her about the Time, she affirmed she
 ' perceived it in about half an Hour or a little longer;
 ' whence I think I may gather, how long the Matter

of light Digestion stay on the Stomach. I would have made many Experiments, but the Age of the Woman, and the Part affected hinder'd me; yet I hear the worthy *Meibomius*, my Fellow-Collegian, hath made some on a Man, and who may, if he thinks proper, consecrate his learned Observations to the Use of the Publick.

BUT to return to *Platerus*: First, This with many other Examples should convince him, that Worms do come out of these Kinds of Passages. Then the progressive Pains, that were a long Time before, not where the Tumour arose, but in the middle *Venter*, shew that the Intestines were eaten and gnaw'd by the Worms creeping out at that Part, where, by the Thinness of the *Peritonæum*, the Passage was the easier; and 'tis worth observing, that no one ever read that they came out at the middle *Venter*, but at the Navel or the Groin. Lastly, It is not likely, that the Imposthume should arise in an external Part, or be so ill look'd after as to make a Passage here, and that the *Peritonæum* should be consumed by the *Pus*; for so the *Pus* ought to have ascended upwards, and gone above the *Os Pubis*, as on the contrary it moved downwards; and if it was so, as the Guts are contiguous, but not adherent, nor keep their Situation, it does not appear how it could be; for the *Pus* would fall into the lower *Venter* to find a Bottom; all which Things seem to make against that learn'd Writer.

NEITHER ought we to mind what he says of their not having a Bill or Teeth, if I am to be believed, for he argues against all Experience; neither was *Platerus* a fit Judge in this Matter, since he wanted Microscopes, by which at this Time of Day we discover many Things, which the Ancients knew nothing of. Now these cruel Pains, which

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Worms cause by their biting and pricking, are sufficient Testimonies, without saying any more of them. But it belongs to them, who have Variety of Microscopes to inquire more curiously, whether these have Teeth, such as we find in the very smallest Worms.

THUS far *Schelhammer*: But in the 13th Chapter we shall find *Vallisnerius* speaking of the Structure of the Mouth, and shall know from him how those Worms hurt the Guts. I saw much such another Case, as this of *Schelhammer's*, some Year's ago, a French Refugee, and even saw a live Worm come out of an old *Fistula*, in his right Groin. But no Body has observed this of the broad Worm therefore that Name should not be so frightful.

If any enquire again which of the Species of the broad Worms are the worst; I answer as to this there is no great Difference. From these Relations evidently appears, That the Women who were troubled with the first Kind, were not therefore barren nor those who were with Child miscarried; so I know not which is the more hurtful. Indeed *Vallisnerius* observed, That his Jew Woman often miscarried, which Symptom he thought might be imputed to the frequent Gnawings of those Worms and the Pains and Contractions of the *Viscera*, which arise from thence. And if the Pains of the Belly are so severe, and do frequently and a long Time torment the Mother, the *Fetus* is of Consequence in Danger; and without Doubt those Pains raised by the Worms, were the Cause of that Jew Woman's Miscarriage. Now, if the *Tania* of the first Kind with all those Indents in its Sides, does not always occasion Pains, the Gourd-worms may sometimes be less painful, nor be so troublesome at other Times, and to all Persons. The Jew Woman miscarried, because those Worms dug continu-

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or more severely, by their Gnawings into her Viscera, when she was with Child. But that Woman of *Dunkirk*, **Gandophelus* speaks of, who was troubled with Worms, brought forth nevertheless four live Children; for neither these Insects were so obnoxious to her, or the Condition of her Womb was stronger. However this Example shows, that these Worms do not always produce Abortions.



C H A P. XIII.

That other Worms besides the broad Worms molest Men. With the Description of the Dog Tænia.

HITHERTO we have treated of the Worms in humane Bodies, and especially the broad Worms, having first removed all the Doubts and Confusions, concerning the Differences between them, and added to their Description those Questions usually raised on their Nature and Signs. Now to end this Institution, before we leave off, I shall observe something of other Worms, of their Original and Rise, and the proper Remedies to cure and expel them; which are contained in this and the two following Chapters.

It appears from what has been already said, That there are two Kinds of *broad* or *flat* Worms; the first Kind is the *broad*, and also *long* Worm,

which may be called the genuine *Tania*. The Second of the *broad*, but also *short Worms*, like Gourd-seed; and from thence called *Gourd-worms*; which stick and cleave to one another, in a long Series like a Link or Chain, and constitute the *Degenerate*, or *Bastard Tania* of *Spigelius*: Besides, we spoke of the *Coat-Slough* or *Bag*, wherein the Gourd-worms are sometimes involved, which hath been taken by some for the Worm it self.

The Ligula or Tongue Worm, a round and long Worm of Men and Dogs.

PLATERUS describes a third Kind, in the same Places in these Words: 'And there is another Kind of *Tania*, correspondent to the former, not broad but round, like other Worms, of a Make peculiar to it self, which we may call a *Tongue Worm*; it is more rarely voided by Men, but more frequently by Dogs, and also immoveable sometimes whole and other Times broke; and sometimes when it is small, sticks and cleaves fast to the *Podex*, that it will not come away without being drawn.' Now its round Make, sheweth how improperly this Kind was reckoned among *Tania*, since those Worms we have been speaking of were called *Tania* for no other Reason, than because they were like in their Form and Shape to Linnen Silk Tape; therefore every *Tania* or Tape-worm is broad and flat, not round. But because Names are at the Giver's Will, I will not dispute with *Platerus* if Worms not flat, but long are, though not properly, called by him *Tania*. And if such round Worms are found in the Intestines of Men, they are very rare; for certainly there is no Notice taken of them by the Ancients. But among Moderns, *Weckerus* says he saw, A Woman of

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thirty-five Years of Age, who voided by Stool with her Excrements, a Worm eighteen Foot long, small but not very empty, not so round as an Earth-worm. But that Worm does not seem to Spigelius different from the *Tania* of the first Kind, which contracts its Sides so as to appear sometimes round; and this is Spigelius's Conjecture, neither is it improbable. But what shall we say to the other Worm spoke of by Bagliivi in his Epistle to Andry, in these Words. I knew a young Man at Rome in 1696. of twenty Years of Age, who was pale, lean, a great Spitter, and very intemperate in Milk-Diet; as he was one Morning cutting an Onion, he was so moved with the Smell, and taken with a Suffocation, that he thought he should have died, till by Vomiting, he brought up a round Worm thirty Foot long, rolled up in a round Ball, whereupon he was presently well. Now if Bagliivi saw this Worm with his own Eyes, he is as good to me as a thousand Witnesses; but I am afraid he has, without examining the Matter well, given too much Credit to the young Man who voided it. And I am the rather induced to believe so, because this accurate Writer mentioning only the Length, passes by the Thickness and many other Things, whereby the Form and Make of this insect would be better known; which he would not have done, had he himself seen this Worm. The third Observation of this kind of Worms, is that of Ludovici, (Observat. 8.) A young Man a Rope Maker, after eating Part of a Cake, hot out of the Oven, was taken with a Tertian Fever. After the second Fit, I gave him two Grains of our most simple Tartar Emetic, (Dispart. 1. a Pharmac. Descrip.) Between his Vomittings, he voided downwards a round Worm three or four Ells long, and half dead; and afterwards giving him the stercoraceous Pouders, mixed with a little native Cinnabar, the Fever left him.

So much for this learned Writer, who might not, as is very likely, have seen the Worm he describes. Also the celebrated *Bartholine* mentions a Worm an Ell and a quarter long, which shall hereafter be inserted in its proper Place.

Of the Dog-Tania, and the other Worms in Dogs and Cats.

As the longer round Worms, which are usually found in the Intestines of Men, rarely exceed a Foot in Length; so those that are found much longer are very scarce and seen but by very few. Neither do I know, whether there are any very long Worms found in the Guts of Dogs; nor whether these kind of round Worms hang often out at the *Podex* of a Dog according to *Platerus's* Observation. 'What Dog *Tania* I have seen were flat, not round, but like the *Tania* in Men, though they did not come up to the Length of *Spigelius's* genuine *Tania*. With these flat Insects, Cats are in like manner as Dogs tormented. The Figure of which, and the Dog *Tania*, are delineated by *Redi*. See *Tab. 9. Fig. 3 & 4*.

NEITHER is this Kind of Worms only troublesome to Dogs and Cats; but according to that Author's Observation, those Creatures labour also under the round Worms, but such as are shorter and smaller, and a third Kind, like the Gourd-worm, as express'd in *Tab. 9. Vallisnerius* describes the Dog-*Tania* thus: 'A Hound of mine after many Gripings, and refusing Meat, vomited up a Worm a Span and a half long, of a whitish Colour, marked with several Incisions or Interstices, like Knot-grass. The Skin was hard and thick, neither was it when de- cleared and transparent, but remain'd bright and firm and of the Colour of a Reed. This Worm contracted and extended it self very quick and agi-

each Interstice or Ring going under the next to it ; and the upper Part of every single Ring was narrower than the under, so that the under ones might receive the upper ones within them. These Rings were flat, not round, but light and shining, not soft like the Gourd-worms. Neither could I, after having examined them carefully, observe any lateral Prominence perforated in the Middle, such as we see in the Gourd-worms. But the Head of this Worm was easily distinguished, and also the Mouth set with some little crooked Teeth. A little above there arose two Globules, which I then took for two Eyes ; but at that Time I was but young, and did not make all the necessary Experiments to be more certain. Moreover, I find it taken Notice of by my Enemies, that at that Time I could not separate the foresaid Rings asunder, without breaking them ; that I observed a Cavity common to all those Rings, or an alimentary Duct passing through all those Rings, such as other Worms have. For at that Time I observed confusedly other Vessels, running variously, according to their Lengths, in every Ring, but they were so small, that I could not tell what Use they were for. These Vessels might serve for the Work of Generation, and perhaps for some other Use, such as is reserved in the round Worms in humane Bodies, being made up of such Vessels, as we may see in *Redi*, and in the fourth Table. Notwithstanding the Tail of the Worm which I saw end in a fine Point, the lower Part was thick or broad, and obtuse.

Thus far *Vallisnerius* : And also the learned *Morgan* mentions the same *Tania*, in these Words, (in his Epistle added to *Vallisnerius* Work of the Original of Worms) ‘ I would not have you think, worthy Sir, that the broad Worms are real and single Worms, but

' but take heed how you give Credit to it; for in
 ' my Opinion, there cannot be found a broad Worm,
 ' that is a real and one single Worm. For there is
 ' nothing that induces me to think so; and I have of-
 ' tentimes taken Notice of flat and long Worms in
 ' Dogs; and because I know you are searching af-
 ' ter, and desirous of a Description of these Worms,
 ' I write to you in as few Words as may be. I have
 ' observed within the Guts of Dogs, some Bodies of
 ' a flexible but thick and compact Substance, some-
 ' thing white and exanguious, about a Span long,
 ' and half the Breadth of a little Finger but
 ' where they are broader, there are they thinner
 ' and flatter; in the middle they are broader, and
 ' the nigher they approach to the Ends, they grow
 ' the narrower, so that they End in a Point. The
 ' Border on each Side, is indented with Nicks and
 ' Incisions, and where the Body is the broader, the
 ' greater is those Intervals, and the narrower, the
 ' less those Distances, and that as regular, as if a
 ' Body of many Triangles were ranged together,
 ' clapping the Points of the one to the Basis of the
 ' other. Wherefore, if I would shew and demon-
 ' strate these Bodies, such as they are, by any known
 ' and common Image or Figure, I could not do it
 ' by any better, than that little one which *Spigelius*
 ' took from *Gemma*, and *Sennertus* describes from
 ' *Spigelius*, with another Figure and many other
 ' Things thereunto. Yet I would not have you
 ' think those Bodies agree exactly with that Figure,
 ' much less that they are a Series of little Worms
 ' joined together. Or Lastly, That they are not
 ' Worms but *Polypus's*; for I never saw any Thing
 ' so much like one Body, as these Bodies seem'd
 ' and though I could not find them alive and moving
 ' I have many and very good Reasons why I do not
 ' think them to be *Polypus's*. First, because the Do-

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in which I first observed them, was incredibly hungry and dry, and would be taken with sudden Fits and loss of Spirits, (which are Signs of Worms.) When I examined the Body and *Viscera* as carefully as I could, there appear'd nothing amiss, besides a great Heap of those Bodies in the small Guts. Besides that certain and regular Order wherein the Incisions and Intervals are disposed, and the particular Formation of those Bodies, cannot, if I have any Judgment, be assign'd to the Peristaltick Motion of the Guts, or their Involutions, but as an uncertain and faint shadowing of many Tapes. For those Things which are sure and certain, ought to have a sure and certain Cause.

THUS far this celebrated Author, who had not the good Fortune to see those *Dog-Tania* alive and moving, such as the *Tania Vallisnerius* saw, which was ejected by a live Dog in Vomiting, whereas these were found in the Body of a dead one. 'Tis not strange, that *Platerus* should not allow his *Ligula* to have Life and Motion, who razes both the Kinds of the *Tania* in Men, out of the List of living Creatures. The *Tania* seen by *Morgagni*, were lesser and perhaps younger, and therefore were only a Span long; neither was the other of a Span and half long, of the largest Size, as I have already remarked, since they were twice or thrice as long. But who ever compares these Descriptions, and *Redi's* of the *Canine* or *Dog-Tania*, with the Description and Cut of the humane *Tania*, we have given, will easily see how great the Affinity is between the two Kinds. If this be allowed, whatever belongs to one belongs to both; but if not, their Nature is altogether different; therefore if this last kind of *Tania* common to Dogs, is an Animal, and lives and moves, if every one of these *Tania* is one Worm,
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and does not consist of many join'd together, as the Chain of Gourd-worms. Lastly, If the same *Tania* bred other *Tania* like themselves, of which the great Number of them found in the Guts, is a good Argument; do not all these Things agree with the *Tania* of the first Kind in humane Intrails? Thus much from *Vallisnerius*, *Morgagni*, and *Redi*, of the *Tania* in Dogs; and for the two Kinds of *Tania* inhabiting our Intestines, enough hath been said already; neither do I think to add a third kind to them, since that *Ligula*, *Platerus* speaks of, ought not to be reckon'd with our *Tania*.

Of the Difference of the Teretes or round Worms in Men.

IF to these we may add the *Teretes* and *Ascarides*, we may reckon four Kinds of Worms in our Intestines: Now the Question is, whether the *Teretes* are an intricate Species, or whether they differ. First, the various Colours these Worms of a common Size, are of, viz. sometimes Yellow, Blood-Colour, and Gall Colour, occasion this Inquiry. The Cause of this Diversity of Colour, seems according to the Opinion of *Aurelianus* and the Observations of some Moderns, to proceed from some Juices those Worms are outwardly died with, or which they feed on. Secondly, They differ as to Length, which in the *Ligula* or Tongue Worm of *Platerus*, and the Worms of *Veckeri*, *Ludovici* and *Bagliivi*, was great. Thirdly, They differ as to the Largeness or Thickness of the Body; for some of them are sometimes found to be much thicker than the common *Teretes*, and much smaller, but these are to be met with for the most Part out of the Intestines. The Worm *Scharffius* speaks of, *Juniperi Descript. Curios. Pag. 231*) in these Words, ought to be reckoned among the thickest Sort. *I gave the Anthelminthick Essence with good Success*

in a Woman of forty-one Years of Age, who complained of Pains and Gripings in her Belly; I gave her also an Ounce and half of Juniper-Juice made into a Conserve, whereupon some round Worms came away; wherefore for the further Expulsion of the Worms, I added this Essence to some other Medicines, which she took for three Days, and then voided a Worm, of the Length and Breadth it is here drawn, (See Scharffius's Cut) which Worm had on its Head a skinny Horn, in its Mouth a little white Stone, as big as a Tare; and might be extended to a great Length; whence we thought it might belong to the broad Worms. The Woman thought it proceeded from Witchcraft, and could not be perswaded out of her Opinion; but burnt it before me, neither could I hinder her, by Words or Entreaties from doing it. By these Words this Author seems to believe, that the Worm he describes, belong'd to the broad Worms; because as he thought that Worm might be extended to a great Length; but though it might have been extended longer, yet the Cut set forth by Scarffius, representing a Worm of a Foot long and six Lines broad, shews that it ought not to be reckon'd among the broad Worms, but rather a kind of round Worms, which are thicker or the thickest of all. But as they differ in Dogs as to their Size, from the Mastiff to the Lap-Dog, so they may in Men in all probability, as 'tis observed by Vallisnerius, of Worms in Calfs, as we shall find hereafter. The other Difference Scharffius notes, is, that the Head of the Worm described by him, had a membranous Horn. So I remember, I once saw a round Worm, no bigger than those which Children daily void, that had either a little Horn, or stiff crooked Hair, on one Side of its Body. Without Doubt there are other Differences between the round Worms as to their Make, which as they are of no great Moment, serve only to distinguish the Kind. There are Examples of the Teretes,

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no larger than the common ones, whose Tails have been flat, which *Redi* observes to differ in the Structure of the inward *Viscera*.

The Anatomy of the Teretes or round Worm found in humane Intestines by Redi.

IN the round Worms or *Teretes* of Men, says *Redi*, there are two Ducts or Tubes to be seen, the one for the Aliment, the other serving for Generation. That which is the alimentary Duct, where it begins, consists of a thick, hard and firm Partition, and is white and very fine. And thence it is dilated for the Space of a Finger's Breadth, in the Shape of a Sugar-Loaf; then the Coat of the same Duct becoming flaggy very thin, and clear, is something straiten'd; and thence again it begins to be dilated, and assumes an Olive Colour, being changed by the Juice contained within. That Tube thus expanded, and bound by the Parts about it, is extended to the third Part of the Cavity, which is the Belly of the Worm. And then again it is straiten'd; and being tied up on all Sides, passes through the Space of the third Part of the other Belly, and being again expanded ends at the Tail, where it opens or gapes very plainly. The Matter contained in this Duct, is a thick muddy Juice, of a dark green and sooty Colour, attended sometimes with Wind. See *Tab. 4.*

THE other Tube serving for Generation, is as white as Milk. And if the *Venter* of the Worm of which we have spoken be divided into three Parts, this Duct begins at the Distance of one of these Thirds from the Mouth, and may be said to be above five or six Times the Length of the whole Body of the Worm. Its Trunk is very small in that Part where it begins, but after is divided

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into two thick Branches, which preserve the same Thickness, and stretch out towards the Tail in many Windings and Bends, and take up a great Part of the Length of the Belly. And from thence, these Branches begin to turn again to their first Beginning; and being very small, tie and twist about the alimentory Duct, like a Hark of fine Thread tangled, neither do they end, but form a circular Duct. See *Tab. 4. Fig. 3.* wherein that Tube is drawn out of its natural Situation, and without the mention'd Circumvolutions, that its circular Form might be represented the plainer.

THUS the Difference between the Worms in Men, and those of the other Creatures before-mentioned, evidently appears; for the Worms of *Dogs, Martens, &c.* have their genital Tube consisting but of one Branch; whereas that Tube, which serves to the same Use in the Worms in Men, is divided into two Branches, which are united in a continual Circle. But that Tube or Duct from the Part it arises at, is fast tied to the inner Parts of the Worm, and the same Binding is continued to the End of the Skin where the Tube ends by a *Foramen*, which is not visible without a Microscope, but upon pressing on the Tube, that Juice which is contained in it, gushes out at the Hole, and wets the Skin, and would be all drawn out by a continual Pressure. This Juice is white like Milk, sometimes thicker like Pomatum, and sometimes more fluid both in the Males and Females. For in all the Worms of an humane Body that I have seen, which have not been a few, I always found this Tube, serving for Generation, made in the same Manner; whence I have suspected, that there is no Difference in the Form and Make of that Duct or Member designed for Generation, of those Worms whether Male or Female.

I observed this in all the round Worms of humane Bodies, except four, which came away with many *Ascarides*, from the Bowels of an Infant and a grown Person; in these four only among innumerable others, the Situation and Form, or Make of the genital Duct was different. For as the Binding and Aperture of the Tube already described, are only distant from the Head, one third of the Worm's Length; the Binding and Aperture observed likewise in these four Worms, reached to the End of the Tail, almost to the Hole where the *Feces* are excerned. And where that binding was observed to be, there was a very fine Duct, and which for the space of four Fingers breadth towards the Head of the Worm, was so expanded, as it was as thick as a Pidgeon's Quil, and then all on a sudden was as small as fine white sewing Thread; and that very white Thread or Duct, which was very small, was wrapt about the Gut in several Bends and Folds. Lastly, The Form of the Duct in all the other Worms, was circular, in these four, the Duct ended in a Point, and contained in the thickest Point of it, a white milky Humour. Of all the Worms I ever saw of humane Bodies, none besides these four had such a Duct. See *Tab. 4. Fig. 4.* And indeed those four Worms differ something from the others in their outward Form, for they had not round Tails, as the common *Teretes* have, but somewhat pressed and flat; and when they were dead, their Tails were drawn up in a Semicircle, whereas the Tails of the others, whether alive or dead, extended in a direct Line. Perhaps my Suspicion, that the Vessels of Generation in all Worms, both Males and Females are alike, may displease some. But 'tis certain, that Nature hath dispensed indifferently this Likeness of genital Vessels to other Insects, as the Shell-snails and

Snails

Snails; which Insects copulate, in a manner, altogether strange, and uncommon, to all other Creatures: For Snails, both Male and Female, have concealed within their Intrails, a genital Vessel, or Member, which seems to be of the same Form and Size in both Sexes. Whenever they would copulate, they let down those Members above a Florence Ell in Length; and fold and twist them together, so, that as I have often observed, that Coition would last above two Hours: and those Members which hang out from the Body, being agitated by the Bendings, Twistings, Foldings, Contractions and Extentions, are sprinkled and bedewed with a white Froth, like a Soap Lather; that Humour runs the whole Length and then remains gathered together at the Ends; and at the same time these genital Members swell with a white watry Juice, adding to that Froth, Matter from the Spermatick Vessels. I have seen sometimes two Snails sticking to a Wall, with their genital Members let down, or unsheathed, with the hinder Parts of them folded close together, and have in those Parts cleaved as close to the Wall, as if they had been tied to it, *See Tab. 9.* Yet the Snail do not always bind and join the gloriated and twisted Ends of those genital Members after that Manner, but leaving them hanging in the Air, oftentimes to the provident Care of Nature. I have many Times found these Insects folded in the Act of Generation together, and have carefully anatomiz'd them, to know which was the Male, and which the Female, but all in vain, for I never discerned any Difference between them; tho' the time may be, when some one more discerning, or more fortunate, will find out the Difference, if any, by my leading the Way.

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THUS far the ingenious *Redi*, since whom, I think, there hath been none more able to distinguish the Sex of Snails; and the most diligent *Vallisnerius* thinks, and even demonstrates by many Arguments, that some other such like Insects, ought to be reckoned among the Hermophradites. Whoever would know more of the Anatomy of Snails, let them consult *Redi*; since what has been here said, is sufficient for us to know how our round Worms may copulate, by the Example of the Snails. —

It hath lately been demonstrated by *Vallisnerius* in his Epistle to the worthy *Lancisus*, the Pope's first Physician, That they copulate and breed by Eggs, which they lay at their due Time, and from which proceed little Worms like their Progenitors; which Epistle I shall here, with that Author's Leave, make bold to insert, since it agrees with *Redi's* Anatomy of our Worms.

The Teretes, or Round Worms in Calves and Men, described by Vallisnerius.

‘ THOUGH I hitherto was content with what was writ by the polite *Redi*, on the inner Structure of the Round Worms of human Bodies, and had resolved with my self, to add nothing; yet when the Eggs, Ovaries, Oviducts, Spermatick Vessels, and other Parts of those Worms, appeared to me uncovered by him, I thought not of insisting on my Resolution; Therefore, worthy Sir, I have thought fit to communicate what Discoveries I have made, to you, who are a constant Maintainer of the Truth, and indefatigable in discovering many Novelties that relate to Natural Philosophy, since my first Epistle on this Subject was

the more illustrated, and compleated by those Observations of that great Man.

BUT since the Eggs and Ovary of the Round Worms, in the Guts of Calves, first observed by me, have afforded a clear Light, whereby I might discover the inner Parts of our Worms, I shall first lay down the Anatomy of them; that I may come gradually to shew their abstruse Structure; for when they are alive, the Works of Nature, which are more open, or obscure, preserving a certain unchangeable Order, are Assistant to us.

I happened, not long since, to see a great Heap of some Round Worms lying in the Guts of sucking Calves, which sometimes kill those Calves, or communicate a nauseous faint smell to the Flesh, from the Corruption of the Chyle, which nourishes them.

HENCE, it came into my Mind, to inspect those Worms more carefully, and to see the Disposition of the *Viscera*, so that I might be the more certain, whether they agree, or not, with those Round Worms common to Men, and I was the more induced to it, because *Redi* hath not mentioned them in his most accurate Observations, wherein are contained, almost, all Kinds of Worms.

THOSE Worms are generally longer than ours and in Proportion smaller, also round, white, and covered with a light Membrane, which is very fine and clear, so that it does not hinder the various Branches of the Spermatick Vessels that lye under it, from being outwardly seen: Also these Branches, if you inspect the Belly, run through the whole Length of the Worms in many Folds and Circumvolutions, as they are represented, *Tab. no. Fig. 2.* But if you look on the Back, then the same Vessels only appear here and there surrounding

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rounding the alimentary Duct, which is here very conspicuous, *See Tab. 10. Fig.* Yet I have observed, that those Convolutions of the Vessels, are not found alike in all Worms, since in some there are many, in others fewer, and are seen in different Parts.

THE Head of these Worms is very fine, not having the Form of an Head, but rather resembling a Sugar Loaf, surrounded with a Circle about the Breadth of the third Part of a Man's Nail, and consisting of very small Fibres, and also having those thick Rings on it, with which the whole Body of those Worms is composed. *See Tab. Fig. 1, 2. Lett. a a.* Moreover, upon pressing that Head, it puts forth from the inner Border of the described Circle, three round Prominences of an equal Distance like three little Hills, which form a triangular Cavity, in the Center of which is seen a Hole, which makes the Mouth of the Worm, or the Beginning of the *Oesophagus*, which is a little Pipe that Worm thrusts out, or draws in, when it feeds. And in my Opinion, that the Artifice, by which those Worms can take and suck in their Food, and stick so closely to the Intestine, consists in the triangular Cavity, since the Disposition of the Mouth is like that of the Horse-leech. *See that Mouth as by the enlargement the Microscope*, and as it appears in the Front Prospect. *Tab. 10. Fig. 4.* and in the Side Prospect of another of this Kind of Worm, without the Microscope. *Fig. 3.*

The Circle, or Swathe, surrounding and distinguishing, as already observed, and perhaps constituting the Head, is divided into two Places diametrically opposite, by some Streaks, or Lines, which kept me a long Time in doubt about the Use; but at length having considered and weighed

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ed the Matter, I thought these might be pulmonary Pipes or Vessels, which afterwards I distinguished in the round Worm of a Man; for in that Worm they were red, or of a yellowish Colour, so that Variety of Colours indicated to me their Structure the more easily. These Pipes, or Vessels, consists of several Rings, and are strengthened in many Places by many transverse Fibres climbing over them: I observed it plainly in that Worm, when opened from the Head to the Tail. From these Pipes 'tis probable, there may arise many Branches, though I could never see them distinctly, not with the Microscope.

In the Space about half an Inch from the Worm's Head, which Part, as it is streighter, we may call the Neck, there is another Hole on the Side, or rather *Passage by which those Worms lay their Eggs*; neither will this seem a new Contrivance of Nature, since we find such a Passage in the same Place, in all Snails, both Water and Land, and other Worms; for in all Worms of this Kind, the genital Vessels are inverted upwards, and afterwards extend themselves downwards, and run the Length of the whole Body in several Rolls; but in some, those Vessels begin there, or not far from thence. This Hole may be seen with the naked Eye, after it hath first been discerned with the Microscope; but it appears more plainly, if when the Body of the Worm is opened, the excretory Duct, of the Ovary be pressed with the Finger; for by this pressing, there issues out of that Hole, a watry glutinous Lympha, in which, with a good Microscope, the Eggs of the Worm are seen swimming; besides that Foramen, or Hole, is set all about with many Branches of Fibres, to which, without doubt, the Vessels, which convey the Serum, that Part is moistned with, belong.

‘ IN the whole Body inspected on the outside, from the Part spoke of already, there are seen ‘ Spermatick Vessels, like a Vine Leaf, so folded and twisted, that at first Sight, they resemble many little Worms; and indeed a good old Man believed them to be so, when throwing one of them under his Feet he trod on it. But if you inspect them on the other Side, they are not so many as I said before, but are seen only here and there, by reason of the Alimentary Duct; for two thirds of the Worm’s Body beginning at the Head, two great white Vessels appear, which constitute the Ovary, as we shall see hereafter.

THE *Tail*, or hinder Part of the Worm, is thicker than the Head, and towards the End, something crooked like a Hook, with a small membranous Matter hanging to it, and ending in an obtuse Angle, and under it is the Hole, where the Fœces are emptied.

‘ I could find no Eyes in the Head; neither do I think, that these Insects, who are doomed to perpetual Darkness, want any; there are, at least but three visible Apertures; first that which is the Mouth, situated in the Head, in the Middle of the Triangle we describe; secondly, that serving for Generation, in the narrower Part not far from the Head, and thirdly, that under the Tail, where by the Excrements are excerned.

‘ WHEN we open the long *Venter*, we meet first with a fine, but very hard Skin interwoven with small Fibres on each Side, but disposed chiefly long-ways and a cross. These, without doubt, are Muscles, though they are not red, but rather white and clear, because they are moistened and sprinkled with a limpid Juice, which is to them the Stead of Blood.

‘ WHEN

‘WHEREEVER you tear, or open this Worm, a *Limpid Water* suddenly follows, watring plentifully all the Viscera in the long Cavity of the Body, and not congealing and thickning when put to a Fire.

‘WHEN that Water was spent, and the Skin dilated, there appeared an intricate Collection of white Vessels, which were the *Spermatick Vessels*, and which, I said, might be seen on the outside; these crept on all Sides, and intangled, yet in a certain Order, sometimes over, and sometimes under the Alimentary Duct, and take up the greatest Part of the Belly, as if Nature was so careful, lest this Kind should perish, that it has so furnished it with these Vessels, that the other Organs seem to be made for their Sakes. See Tab.

11. Fig. 2.

‘I found a Worm in another Calf, much shorter, and thicker, than the others, whose Skin was darker, so that the white Organs of Generation were hardly to be seen through it; Half of which Worm, from the Head, I have drawn, such as the 3d Figure of the tenth Table expresses. This Worm was of the same Kind as the other, but more bulky or rougher, and swoln; if you should compare it with the others, there would be as much Difference between them as there is between a Country Man and a Courtier, which accidental Variety is likewise observed to be in other Sort of Creatures. In this same Worm the Head and Mouth are more easily discernable, that there was no need of pressing, and that small Constriction of the Fibres in that Part the Eggs proceed from, appeared plainly; yet we must impute it to the Drawer’s or Painter’s Negligence, that the *Spermatick Vessels* he delineates, do not appear through the Skin, or at least, but ob-

securely : But to return to the inward Structure of these Worms.

UPON opening them according to the Length of the Belly, there were only those innumerable little white Ducts to be seen, which were bent and turned so, that they formed so many Meanders. Those that were nigh the Tail, were smaller than those towards the Head ; neither did they terminate at two separate Ends, but being united, made a circular Duct ; tho' the whole Belly is filled up with these Vessels, like a handful of twisted and entangled Thread, yet the long *Alimentary Duct*, reaching from the Head to the Tail, is seen in some Places, as also the *Double Ovary* which we may call *Two Ovaries*, which are afterwards joined in the End, and become one common Duct. See *Tab. 11. Fig. 2.* representing the Worm opened, in which the *Spermatick Vessels* lying upon the *Ovaries*, are drawn, by me, obliquely out of their proper Situation, that they appear bare and naked, and their Beginning and Ending as well as the various and intricate Windings of the *Vasa Preparentia* and *Seminalia* are plainly to be discerned to the End of the Tail : I also drew out the *Alimentary Duct*, so that only the thick Knot of those innumerable Branches appertaining to the genital Organs, were to be seen : But if you open these Worms in the back, you do not meet with so many *Spermatick Vessels*, tho' there are here pretty many, but the whole *Alimentary Duct* is very easily seen ; likewise the *Ovaries* very plainly appear to the Part where they become one Duct. In this Situation the *Spermatick Vessels* seem thicker towards the Head than the Tail ; but that you may know how these Vessels surround the *Alimentary Duct*, this their twining differs something from that of the Ivy, which, where

creeps

creeps, there holds fast; whereas our Vessels form a moving Circle; whence it comes, that they fold round this Duct, sometimes in one Place, sometimes in another.

The excretory Tube of the Ovaries hath its Passage very nigh the Head, that is, about the third Part of the Worm's Length, as we observe in the round Worms in Men. See *Tab. 10. Fig. 2. the Letter b.* and *Fig. 3. Letter b.* and *Tab. 11. Fig. 2. Letter b.* This excretory Tube we call the *Oviduct*, common to both the Ovaries, not only analogous to the Oviduct of Viviparous Creatures; but to the Oviduct of the Vagina, or Womb. That Tube is an Inch long, and ends in a very fine Point, whose Mouth discharges it self out of the Body, *Tab. 11. Fig. 2. Letters b. c. d.* or *Fig. 3. Lett. a. b. c. d.* and ascending like a Tunnel, is dilated, which, as well as the Oviduct in the round Worms of Men, I have always found full of a lymphid Matter at least, at the Part *d.* in which part 'tis probable, there is some Stay in the stead of a Valve, and a very white Matter begins there to appear, which is nothing but an Heap or congeries of Eggs, ready to be laid. That Duct is not very long, (as far as the Letter *b.* of the 2d. *Fig. in the 11th Tab.*) where 'tis divided into two Ducts about three Inches long. These Ducts are two Ovaries, or a *double Ovary*, as they who treat of the like Ovaries in Fishes, call it. These Ovaries are of the Thickness of a Pidgeon's Quill, and consists of a fine clear Membrane; and it inspected by a Microscope, they contain an innumerable Heap of Eggs, the Superficies is unequal, and like a swell'd Vein, by Reason of the various Clusters form'd by these Eggs, and which are there contained, and appear. These Ovaries are in some Places clasped round by the Branches of the Spermatick Vessels, like so many Vines, just in the same

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' same, Manner as we said the Alimentary Du& w
 ' infolded, within them : But upon opening them t
 ' Eggs are seen more plainly, especially if you l
 ' that Matter, (which *Redi* says he found in the
 ' Worms of humane Bodies, and which he calls *wh*
 ' and *milky*) on black Silk, and inspect it with t
 ' Microscope, for then you see them very plainly, an
 ' they appear innumerable. After I had seen the
 ' Eggs with a Microscope, I used afterwards a sing
 ' Glas, and saw them in like Manner ; but if yo
 ' inspect them in their Nest or Ovary, you ma
 ' see them in round Heaps, and divided into Bun
 ' ches, and every one hanging to its Stalk, or Stem
 ' whereby 'tis nourished. These Eggs appear clea
 ' and fortified by a firm shining Coat, and of a
 ' Oval Form, when put into the Microscope, i
 ' which the smallest Figures are discernable
 ' and the Rays of the Sun are seen : they bear bo
 ' ling, and coagulate like Hens Eggs ; bu
 ' are always found intermixed with a shining
 ' glutinous Matter, that lubricates and washe
 ' them.

' That I might be more sure these were rea
 ' Eggs, I took that other Liquor in the Sperma
 ' tick Vessels, which appeared the same to the na
 ' ked Eye, but when inspected by the Microscope
 ' seemed to be a pure Matter and Humour, neither
 ' had it any Parts of any Form, Also I inspected
 ' the Liquor contained in the Ovaries of a very lit
 ' tle Worm, but could distinguish only some little
 ' Points, which in Proportion, were less than the
 ' others, like as the first Beginnings of Eggs in Pul
 ' lets, are, in comparison, less than the Eggs in
 ' Hens. Afterwards I consulted many of my Friends
 ' and these very learned and curious Men, who, up
 ' on examining the Matter, all unanimously agreed
 ' that they were real Eggs. See one of these Eggs

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such as it appeared in a good Microscope. Tab. 11.

Fig. 5. Those two Oviducts, as I have already taken notice of, were about three Inches long; but this Length varies according to the Size and Condition of the Worms. Towards the Bottom of the Belly they are very little distant from each other, and appear tied together, as well as we can observe in so small a Matter. I have often found one of these lying on the other, but in that Place where they are straightned and fastned, as Tab. 11. Fig. 2. Let. g. or, Fig. 3. Lets. ff, expresses: And where these are at their End, I have often seen them bound and entangled with a fine Membrane: Also I have found those Ducts suddenly streightned into two narrow Tubes, six Straw breadths long, which have been tyed together, and then separating again, and tumifying, they form a bladder in the Shape of a Pear. See Fig. 2. h. and Fig. 3. g g, then growing less again for some Space they turn back again towards the Ovary. And if you trace them in all the cross Ways, you'll see them after some watry Windings and Turnings, dilated again, and form another Bladder, represented by Fig. 2. l. and Fig. 3. 11. and thence straightned again; and this I have observed in some, five Inches and four Straw breadths from the first Bladder. After this triple *dilating* and *Constriction*, those Ducts go on without any Change of Form, but begin to entangle and twist themselves in so many Ways, sometimes to the Right, sometimes to the Left, one while towards the Head, and then the Tail, that it was as impossible for me to separate them without tearing them, tho' I tried to boil them in Vinegar, Oil, sharp Wines and several other Liquors, both with and without Medicines, as to trace out the intricate Course of the smallest Fibres of our Brain, yet I
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' separated two Ells of them, whole, and without
 ' breaking, and reckon'd there might be as much
 ' behind, which I could not separate, as was fifteen
 ' or sixteen Times the Length of the Worm. I look
 ' upon this immense Series of Vessels to be a wonder-
 ' ful Heap of Organs designed for the Preparation
 ' tion of the Matter by which the Eggs are made
 ' and render'd fruitful; To this Congeries, or Heap
 ' I give the common Name of *Spermatick Vessels*
 ' which were confounded in the Round Worm of
 ' Martins, Dogs, &c. with the Ovary and excre-
 ' tory Ducts by *Redy*, and called by the general
 ' Name of the *Organs of Generation*, not determining
 ' which were the *Vasa preparantia* and *Spermatica*
 ' for he had not then discovered the Eggs I have
 ' had the Happiness to do, to be the Cause or Foun-
 ' dation of the whole Contrivance.

' That the Structure of this exquisite Organ might
 ' appear the more evident, I took the whole Ovary
 ' with part of the Vessels as far as the second Blad-
 ' ders, out of the Worms Body, and had it deli-
 ' neated, that I might give you, Sir, a clear and
 ' just Idea of it, if you look on the Cut, *Tab. 1.*
 ' *Fig. 3.* and consider the Explanation of that Table
 ' But before I go on to the other Parts, I shall
 ' here by the Way, lay down two Things, which
 ' in my Opinion, relate to this Structure as it is
 ' and which, when opened, as I may say, agree
 ' partly with the Structure of the twisted Vessels
 ' which are allowed to be the Testicles of the
 ' Males, and partly with those observed to be the
 ' Ovaries in the Females. First, The Cause of this
 ' Structure seems to be this; these Worms are Her-
 ' maphrodites, that is Partakers of the Nature both
 ' of Males and Females, which is observed in both
 ' the Kinds of Snails, Muscles, Oysters, and many
 ' other Sorts of Shell-fish; and therefore I think

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they were furnished with both the Male and the Female Organs of Generation, that they might use each of them; and for this Reason they were found so stored and full of these Kinds of Organs, contrary to all other Creatures, who consisting of Male and Female only, have each their proper Organs; and are never found so abounding in the Vessels of Generation.

This Opinion, I have laid down with Hesitation, there's in the Structure of those Vessels now described; for these so long and many white Ducts, form'd like so many very small and fine Guts, and which are called by me *Spermatick Vessels*, are very like the Testicles of all Male Creatures of all Kinds, both great and small; neither can we tell the Difference, unless the Vessels of the Testicles are so closely wrapp'd up and folded like a Ball of Thread, (as appears from all the Cuts of the modern Anatomies) that they might be contained in a lesser Space, or for other Reasons best known to provident Nature; whereas these Vessels of the Worms are extended and lengthned out so as they are distributed nicely through that very long Belly. But if any one will say, that the Testicles of those Male Animals, which are called perfect, are not like Thread wound up, but as some will have it, consist of many, like blind Guts lying on, and cleaving to one another, the Matter will lye where it did, in Relation to the Analogy of the Form; because there is a mutual Communication between those Ducts, that they tend both to one common Duct; the Mouth whereof opens at the *Epididymides*, as the *Epididymides* empty themselves after many Windings into the Ejaculatory Ducts.

THERE-

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' Therefore this wonderful Congeries of Organs
 ' is first designed for the forming of the Seed, which
 ' fecundates the Eggs; and for this Reason, the
 ' Ovary is situated by Nature at the Bottom of
 ' them, being furnished with all those various Con-
 ' strictions, and Dilations, to separate the Seed; and
 ' by its longer Stay, to render it to that Degree of
 ' Perfection, as to fertilize the Eggs. The second
 ' Use of this Congeries of Vessels is, that a second
 ' Juice is prepared in them, for the compleating
 ' as it were, the internal Nutriment of the Eggs, that
 ' they may be perfect and want nothing necessary
 ' for the Eggs of this kind of Creatures. This se-
 ' cond Use is confirm'd from the Example of Frogs
 ' Toads, Lizards, and other living Creatures of
 ' the same kind, in which both the Male and Fe-
 ' male are distinguished; for in these Creatures, the
 ' Ducts are observed not to be unlike, though they
 ' are much shorter; neither are they, as in our
 ' Worms, laid upon the Ovary, but under it. But
 ' those Ducts do not only serve to convey the Eggs
 ' out of the Body, but pour into those Eggs the par-
 ' ticular Matter they contain; which Matter not
 ' only attends them, but also involves, sticks to them
 ' and is of the greatest Use. The same Thing we
 ' observe in all Fowls, whose Duct is shorter.

' In all Snails, which Insects are at this Time
 ' reckon'd by all Authors among the *Hermaphrodites*
 ' all the Organs, both Male and Female join, tho'
 ' their Position is various. And *Redi*, *Marfilus*
 ' *Harderus*, *Pegerus*, and lately the *Academy at Paris*
 ' mention these *Hermaphrodites*.

' But while I consider, the plain Structure of the
 ' spermatick Vessels in these Worms, I am led to inquire
 ' into that of the *Glands*, which secrete the various
 ' Humours in this Body, and those of larger Crea-

tures

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tures: So that in the second Place, I shall lay down what I have to say, in these Words. It is carefully sought after by the most noted Anatomists of this Age, whether the Glands be not as so many Sieves, through the Holes of which, only those Juices pass, of which the Particles answer in an equal Proportion to those Holes; or whether those Glands are nothing but *Bottoms or Gatherings of the Arteries* folded together, which sensibly decrease and grow smaller, till they become so small and fine, as the Figure of their inner Cavity is so altered and changed, that only that Juice, which may pass through this Cavity, is prepared or separated in it? So the Vessels of our Worm, seem according to this second Opinion, which is more likely than the other, to be demonstrated *Spermatick*, as they are very long Ducts, by the sole length of which, the great Work of fertilizing the Seed, and the Egg is ordered and performed. For if it should have been done by Sieves, Nature had only prepared little Bags or Bladders, perforated with several Pores, by which those Juices, the Particles of which, would have been of a Form, diametrically corresponding to each of those Pores, might be in a short time separated and divided. But 'tis shewn to be otherwise, by that plain Fabrick and Make of those Ducts, in which only the sanguinary Liquor taking up their whole Space and various Bendings, is sensibly, as if in a Chymical Furnace, work'd up, prepared, maturated, and changed at length into a seminal Matter; towards which, 'tis probable, that the inward Form of those Ducts being changed, might serve and assist; that when they were extended out to a Length they might more or less grow small, and be variously infolded, or grow straighter and narrower in some Places.

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' But to return to where we left off, and to pur-
 ' sue this Anatomy ; upon taking away all the Or-
 ' gans of Generation, the *Alimentary Duct* appears
 ' from the Head to the Tail, in the Cavity whereof
 ' there was a liquid Pap, of a Clay Colour, inter-
 ' mix'd with many airy Bubbles. That Duct
 ' beginning at the Mouth, is at first very much
 ' straightned, but after a small Space, is sensibly di-
 ' lated, and so continues to the Tail, where it grows
 ' small again, and opens at the *Anus* with a very lit-
 ' tle Aperture. Its Form is almost every where the
 ' same, that neither the Stomach nor Guts, are easi-
 ' ly and openly distinguishable ; whereby the Opini-
 ' on of those Authors seem'd to be approved, who
 ' will have the Guts to be only a long extend-
 ' ed Ventricle. This Duct consists of a clear and
 ' transparent Membrane, in which the circular and
 ' long Fibres, are observant to its watry and peristal-
 ' tick Motion. It sticks to several Parts ; from
 ' whence there arise small invisible Ducts, which are
 ' undoubtedly in the stead of Blood and Milk-Ves-
 ' sels, Nerves and Ligaments ; since all these Parts are
 ' necessary to that Animal, be it never so small, to
 ' be consistent with the natural Oeconomy of its
 ' Body. I could not find from whence that limpid
 ' Water, which filled up the whole Cavity of the
 ' Worm, drop'd ; all the Parts of this little Body
 ' were so small and clear. But if we consider, and
 ' compare the Bodies of large Animals with that of
 ' this Worm, we may proportionably argue, that Lym-
 ' pha proceeded from those minute Glands, which
 ' are spread through all and most of the Membranes
 ' according to the Observation of *Malpighius*, who
 ' found these Glands innumerable in the *Pericardium*,
 ' *Peritonæum*, and other Places ; so that we may
 ' suspect this Humour, distill'd from those Mem-
 ' branes, whereof that long alimentary Duct con-
 ' sists.

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gists, or from the *Peritoneum* that compasses the Belly of the Worm. But when that Liquor was put to the Fire, it did not thicken as that Juice which is appropriated for the Nutrition of Animals, therefore I do not think it serves to nourish or increase the Worm, but rather to moisten that tender and flexible Congeries of spermatick Vessels and other Ducts; for all these Vessels were soon dry'd, and would be unable to perform their Functions and necessary Motion, unless they were, like our Heart and other Parts, which ought to be in a continual Motion, be-dew'd with this friendly Water, and continually moistened with it.

AFTER the Organs of Digestion and Generation were removed, and this watering Humour emitted, there seem'd only to remain some bare Membranes; but if you examine and consider them carefully, you will find them made up of various Organs, necessary in the Structure of those living Creatures which move from Place to Place. For upon holding those Membranes up in the Air, there appears a clear transparent fine Vessel, the length of the Back, sometimes dilating and contracting it self, which in my Opinion, is nothing but a long Series of little Hearts, such as is evidently observed in Worms which feed on Greens, and other Creatures of that Kind; and also you may observe innumerable Branches of other small Vessels running out here and there, which are probably the *Veins* and *Arteries* of the Worm. But I would have you take Notice, that you should inspect these things when the Worm is alive, or a little after tis dead; for otherwise they disappear. The Pulmonary Pipes already mention'd, and which reach from the Mouth to the Tail, are of an equal Distance from both the Sides, and exactly in the middle.

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THESE

‘ THESE are all the Observations I could make, on
 ‘ the Worms in Calves, at those Times I could be
 ‘ spared from more weighty Concerns. But I shall
 ‘ attempt by this smooth’d Way, and from that
 ‘ Light to illustrate the Anatomy, and hitherto ob-
 ‘ scured Trunk of the round Worms in Men, and
 ‘ add, many useful and necessary Things observed by
 ‘ me, to those discover’d by *Redi*, whereby the me-
 ‘ dicinal and natural History may be enriched.

‘ THEREFORE, as the Means how those Worms are
 ‘ propagated, have not yet been evidently enough
 ‘ manifested, and I having a Mind to explain a Mat-
 ‘ ter of such Moment, hitherto sought after in our
 ‘ experimentory Academies, have begun, now my
 ‘ publick Lectures are over, to treat again of the
 ‘ Anatomy of those Worms; and to recollect those
 ‘ Things observed by *Redi*, and proceed further if I
 ‘ am able, that I may plainly demonstrate, that
 ‘ these Insects and all others proceed from Eggs.

‘ ON the first of *June* 1712, one of our Worms
 ‘ was brought to me, which seemed outwardly
 ‘ darker, of a thicker Consistence, harder, stronger
 ‘ and more nervous than the Worms in Calves, and
 ‘ shorter than others like it self. The Skin inclines
 ‘ towards a reddish Colour, and some of them are al-
 ‘ most entirely red; which we must attribute to
 ‘ their muscular Skin, which is much thicker than
 ‘ that of the Worms in Calves; and herein consists
 ‘ the greater Strength of our Worms, and also the
 ‘ internal *spermatick Vessels*, not being so clear and
 ‘ transparent, which appear obscurely, together
 ‘ with the *two forked Ovary*, like some whiten ran-
 ‘ led Thread. But never were there any Worms
 ‘ found so like ours at the first Sight, as to their out-
 ‘ ward and inward Form, as those Worms in Calves
 ‘ and I did almost believe them to be of the same
 ‘ kind, but upon considering them nigher, I found some
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' milky Colour are seen, which are so twisted and en-
 ' tangled, that they surround the alimentary Duct
 ' like Ivy : But when they have crept down toward
 ' the lower Part of the Body, they turn back a-
 ' gain, in many Windings and Turnings, from
 ' whence they come and are twisted again, and
 ' folded a thousand Ways, that tho' they are of
 ' prodigious Length, yet they take up but little
 ' Room, as we may observe in the Guts of living
 ' Creatures, and the Fibres of our Brain; and
 ' they were disentangled and stretch'd out on a Ta-
 ' ble, they would be about twelve times as long as
 ' the whole Worm, and not only fifteen times as
 ' long, but sometimes seventeen, as a worthy Per-
 ' son thought. These Vessels begin where the two
 ' larger Ducts, or two Ovaries end, or rather de-
 ' duct their fecundary juice within them. They
 ' are finer than these Vessels in the Worms of Calves
 ' and being united together, and in an half cir-
 ' cle, and do not ascend upwards, but all twist
 ' downwards, towards the Place where the Ovary
 ' is divided into two Forks.

' THE Ovary with its excretory Duct, lies some-
 ' thing farther off from the Head of the Worm
 ' than the Ovary in the Worms of Calves; there-
 ' fore Redi says right, *If the Belly of the Worm be*
 ' *divided into three Parts, the Tube of Generation be-*
 ' *gins at the Distance of one third from the Mouth*
 ' Also that Duct, as before described, resembles
 ' Tunnel, in which the Ovary cleaves, and is di-
 ' vided into two thicker Branches, which reach to
 ' the Tail. Moreover, we ought to observe, that
 ' the Trunks of the Ovary of our Worms are as
 ' long again as those of the Worms in Calves, and
 ' extend to six Inches in length, which might be
 ' the Occasion of Redi's Mistake, not knowing
 ' them to be such. See Tab II. Fig. I.

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THESE Trunks or those Ovaries which curl and twine towards the Tail, are not, as in the Worms of Calves, entangled together where they end, but go on separate till they reach to the Beginning of their Spermatick Vessels, (*See dd*) and are there on one Part covered, and in some Measure entangled with the Alimentary Duct, which is in this Situation always much dilated; neither hath it at its End (*dd*) those two round Bladders of the Shape of a Pear, so very conspicuous in the other Worms, but are rather dilated in an Oval Form, and thence streightned; and there begins the already mention'd *Spermatick Vessels*, turning upwards again, and forming those Circuits and Twinings described, to their very End, which *Redi* observes to resemble Semicircles, which I have cut off in my Cut to save the In-graver Labour.

These Ovaries are unequal in their Superficies, yet the Knot of Swellings are not seen so frequent in them as in the others; and those Swellings are divided into so many Oval long Ells; wherefore if the Ovaries are extended and lengthned out by Force in the Beginning of their Division, or forked Form, in which Part they seem like Snakes, or Worms, they obtain the Shape of a long round Vessel contracted and dilated at equal Intervals.

They are likewise very full of Eggs, which appearing to *Redi* like a *white milky Matter*, led him into that Mistake, because he either did not bestow time enough in examining them carefully, or had not a good Microscope; for that Matter as well as that in the Ovary of the Worms in Calves, ought to be laid on something black and smooth'd, and then curiously inspected with a Glass Instrument, moved till it hits exactly on the Point sought after? for then the Eggs will appear round in a

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shining Tunick, or Coat, and will plainly be seen swimming in, or mix'd with a liquid Matter. But if inspected in their proper Cells within the Ovary, they appear fitted to their proper Stalks, in Bunches; and all heaped together, as we see in the Ovaries of Fishes, especially that of the Eel described by me; so if you look with a good Microscope, or Nit Glass, into the Ovaries of Oysters, which seem to be only a concreted Milk, whence 'tis called by the Fishermen *Milk*; other very minute Oysters will appear to you form'd in their Shells, which is amazing, and in which I have taken great delight. And after the Eggs of our Worms have once been seen with the Microscope, and the Eyes been acquainted with their Form and Situation, you may afterwards discern them with a Nit Glass, how you will. These Eggs and that *Lympid Juice* in the *Oviduct*, are hardned by boiling; but the *Limpha*, that nourishes the *Viscera*, and other Parts of both the Worms, as I have already observed, does not in the least, thicken. Now the *Spermatick Vessels* of both Worms in Men and Calves, when dry, become clear and transparent; but the Ovary, though dry and hardned, never is clear, and the Eggs heap'd together, appear always light and white, so that tho' they are in Heaps, any one may easily see they are real Eggs.

This prodigious Congeries of Eggs ends with the *Oviduct*, in which Place, as I have already advertised, when I treated of the Worms; I think there is a Stay like a Valve, that the Eggs may not be voided before their Maturity; or due Time; the remaining Part of this *Oviduct* is short and always full of a very waterish *Limpha*, which I have often found these Eggs loose and swimming,

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THESE Eggs are met with no where else but in the double Ovary, and its excretory Duct, as I have often taken notice when I inspected the Juice of the Spermatick Vessels, which always appear to me a meer Humour, wherein there was not the least Sign and Appearance of Eggs. Upon pressing this Double Ovary towards the excretory Duct, Eggs presently fall down, mixed with the said Limpha, when they pass through that Passage described before, which is in the Stead of a Vulva, Which in these Worms is strengthened with many Fibres, which should be muscular, that that Mouth or Passage, whereat the Eggs are excluded, might open and shut of its own Accord; and perhaps there are Vessels of a different Humour, whereby they may be more moistn'd.

BUT by that Description of Redi, of those four round Worms which were seen by him, and were different in their make, that is, their Tail was flat both the Ovary and Spermatick Vessels are mark'd out and decyphered, tho' then he knew nothing of them; and are expressed in the 4th Figure of his 10th Table, which answer here to the 4th of the 11th Table; these are his Words. *Where that Binding was observed, there was a fine Duct of Generation, which for the Space of four Fingers Breadth towards the Head, was so expanded, that it was thicker than a Pigeon's Quill: Afterwards it grew suddenly as small as a fine white sewing Thread; and that white Thread which was throughout very small, twisted round the Gut in many Windings. Lastly, as the Form of the Tube in all other Worms was round, in these four it ended in a Point, and contained a milky white fluid, especially where it was the thickest. Thus much for Redi: Therefore that Part of this Tube or Duct, which towards the Head, was so expanded, that it was thicker than a Pidgeon's Quill, and af-*
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terward grew suddenly small, was the Ovary remarked and signified by me: See Fig. 4. b b b b: But that white fine small Thread, was only the single Spermatick Vessels which begins here: And if the white milky Fluid, which this Duct contained had been laid on any Thing Black, and been inspected with a good Microscope, he would have seen that that Humour or Liquor was a Congeries of Eggs mixed with a Limpha.

ANY one may believe these were the Male Worms, and the others the Females, as Redi observes; but as I found the Worms in Calves, and ours always alike, of which I have opened six hundred; these are very rare, neither have they other Organs that resemble a Genital Member such as are observed in Snakes, Frogs, Lizards and other Creatures of that Kind, but only those which resemble the common Receptacle of Eggs and Spermatick Vessels; therefore I thought they might be reckoned Hermaphrodites, and of a rare and peculiar Kind.

HAVING thus view'd the Organs of Generation and afterwards inspected into those appointed to convey the Aliment, I found them very well described and delineated by Redi, (See Tab. 4. Fig. 2.) But I wonder he should make no mention of that long Series of little Hearts, of the Side of the Tracheæ, and innumerable other Vessels, where some were seen with a Microscope, and some without, expanded into the Air: But perhaps he would have treated of what remained, in another Book he design'd to Print.

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So that prevented by Death, we often leave our unfortunate Works unfinished, to be consumed by Moths.

BUT I shall not describe these little Hearts, in the Tracheæ and many other Vessels, nor the Humour wherewith the whole inward hollow Structure of these Worms is water'd, since there is no difference as to their Form, in the Worms of our Bodies and those of Calves; yet I observe that *Redi* in the Cut of his Worm, expresses the Likeness and Course of the lateral Tracheæ, which make Wrinkles in the Worm from the Head to the Tail, but leaves them un-nam'd; tho' his Draught's-Man hath not delineated and drawn all these well no more than the Organs of Generation. See *Tab.*

4. *Fig. 3.* And his Fault is, the Spermatick Vessels, which begin a little above their inward Bending, are thicker and not so long, as it was likely, they were represented by him; so that the ending of the Ovary, and the beginning of the Spermatick Vessels are not very distinct.

It remains that I should inspect the spinal Marrow and the Brain in these Worms, and those of Calves; but I own, that it was impossible for me to dissect them, and to affirm, that I saw them plainly; for as these Parts are in these Worms as well as in all other living Creatures; yet they are so clear and small, that they cannot be discerned or separated; neither am I one who asserts what I never saw.

PERHAPS, Sir, you may inquire whether these our Worms and those in Calves copulate? and whether they have any fixed or certain Time, whereat, as I may call it, they may celebrate the Nuptials, like Snails and other Insects of that Kind, tho' Hermaphrodites; or whether they become fruitful of themselves like Seaplant Animals, as

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‘ Oysters, Cockles, and Muscles, so that Husband and Wife, Lover and Mistress, Bed and House, Nest and Sepulchre, are with them the same Thing; and these Insects singly copulate each with it self in its own Shell, and hath its own Belly for its Bridal-Chamber.

‘ BUT the Solution of this Problem proposed by me in my first Epistle of the Generation of Worms, is very difficult, since these Worms only Securate within the impenetrable Cells of ours, and Calves, Guts, and no where else; and as no Body ever saw them in Copulation, unless he dissected the Calf alive, or their reeking intrails, at the Time those Worms celebrate their Nuptials, which I think is a very difficult Thing, since they are quickly sensible of the last Motions and Agonies of their Host: But if there is any Room for Conjecture, I think, it may be taken from the Example of the Earth-Worms, that our Worms, copulate like Snails and other Insects; (See Table 9.) and it may be, that at the Time when Children are very much griped, and breath a smell, which Women call a *Smell of Worms*, may be in Conjunction, since all Brutes, especially of the creeping Kind, at that Time exhale a most foetid Smell.

‘ FOR I observe, that those Animals which breed singly of themselves, without the Comfort of another, have not progressive Motion, and are formed by Nature, that they are fixed or tied fast to one particular, or like wild Beasts lurking in their Dens, lye concealed all their Life in some hard Matter, that they can never stir from thence. Therefore as our Worms are altogether unlike those Creatures, and can stir from one to another, and be united in Embraces, ’tis probable they do so.

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'I now confirm what I said in my first Epistle, that the Powder of dead Worms cannot regenerate; but when I had clearly seen the Ovary and Eggs of those worms, I began to suspect that though the Powder could not regenerate, yet the Eggs might be excluded and mix'd with it, if they were maturated and impregnated; but we shall easily put a Stop to this Evil, if to take away that Powder from the Patient, we bring and take away the Ovaries from the greater and growing Worms. By this means we shall be secure from the Worms which occasion a new Distemper, breeding again, since if what is delivered by some Physicians be true, that Worms are raised again from their Powder, those Worms do not proceed from the consum'd Carcases of other Worms, but from the Eggs, which happened to be mix'd in that Powder.

'THUS much for the Anatomy of the Worms in human Bodies and those of Calves; but so great, Sir, is your Penetration, that you will sooner conceive how great a Light this Discovery, tho' it may seem to some, to be of no great Moment, will be to those many Obscurities, which have hitherto darkned the Medicinal and Natural History; for hereby the many Phœnomena which have employed the Learned, and all Lovers of Truth, may be clearly and evidently set forth.

'I. AND First, those Things are thus more and more confirm'd, which I delivered in my first Epistle concerning the Procreation of Worms in humane Bodies, from their Progenitors like themselves; whence it follows that what hath been said by others is false, that those Worms proceeded from the Eggs of other Worms of a different Kind, received in, either by Fruit, Drink, Meat, or Air; our Worms are so fertile from their own
'Eggs,

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‘ Eggs, That we need not search outwardly, for
‘ those Things whereof we have such Plenty with-
‘ in us.

2. ‘ ’Tis very plain, That these Worms may pass
‘ from the Mother to the Son, if we only consider
‘ the great Number of Eggs, how minute and
‘ light those Eggs are, and their Form ; then I ex-
‘ plain’d as in my first Epistle, how they may lie in
‘ the Passages by which, the Chyle is convey’d to the
‘ *Fœtus*, and afterwards be bred and excluded, or
‘ how they may be mix’d with the Milk, the Child
‘ is nourish’d with.

3. ‘ It will not seem so strange, that such Number
‘ of Worms should be found sometimes in our In-
‘ trails, since every Worm contains in its Ovary,
‘ thousands of Eggs.

4. ‘ THERE are more Worms in Children and
‘ Calves than in adult Bodies, because the Milk
‘ and soft Diet they are fed with, agrees the best
‘ with the Worms, so that they increase and multi-
‘ ply much quicker. Secondly, By reason of the
‘ greater Fluidity, or looser Consistence of the Ex-
‘ crements, so that the little Worms hardly yet bred,
‘ may not be so easily included in them, and the
‘ Eggs of the greater Worms remain free, and so
‘ cannot be wrapt in those Excrements and voided
‘ with them, but rather the Eggs and Worms stick
‘ more easily in the Furrows and Wrinkles of the
‘ Guts, and are there excluded and increase. On
‘ the other Hand, adult Persons who are Melancho-
‘ ly and bound, are not so much troubled with
‘ Worms, as well, because in their various Meats
‘ and Drinks, there are many Things obnoxious to
‘ Worms, by reason of the harder Consistence of the
‘ Excrement, wherein the little Worms and Eggs
‘ are involved and detained, and the inward Parts
‘ being scoured and scraped, they are killed before
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they are voided and grown up. And for this reason sucking Calves and Children are more troubled with Worms than adult Persons and grown Cattle.

5. 'WE observe, that Children at that Time they are taken from the Breast, change their Food, and begin with several other Aliments, both with and without Milk, they are oftener worse with the Worms, than when they fed on Milk alone, yet we must not therefore think that they were free from Worms; but that they were quiet and content while they were fed with Milk; but upon changing the Meat, the Worms are disturbed and troublesome, especially when the Food is received or fours on the Stomach; either by reason of Childrens Greediness, or some of the Aliment being adverse to these Insects, or because the new Food cannot be dissolved by the weak and yet unactive Ferment of the Stomach. And this was the Occasion of the many learned Writers mistaking, who thought Children had only Worms when they were taken from the Breast, and fed with several Meats, as if the Worms bred then, whereas they only then began to appear.

6. 'Tis manifested, not according to the common Opinion, that Worms are bred from the Use of Sweet-meats or Fruit; but that they are kill'd by them, and cannot therefore be bred by them, which *Redi* hath demonstrated, and I shall consider when I treat of the Remedies to kill Worms. For when the Worms perceive those Meats are obnoxious to them, they suddenly wind and twist; or grow hard and cold, and afterwards strike, prick and bite the Guts trying to avoid them; so that the poor Children cry, are uneasy, tormented, and have Pains from which they were free, when the Worms lay quiet and still.

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7. ' CONSIDERING the Plenty and Smallness of the Eggs, we may easily know why Worms are sometimes so difficult to be rooted out by all Kinds of Remedies. For though those Remedies may act upon the Worms, kill them and exterminate them yet there will remain some Eggs, included or detained in the Mucilage and Wrinkles of the Guts either lying hid in the Side-bag of the blind Gut or imprisoned within the Cells of the Colon, which Eggs being secured with an hard light slipper Shell, are not hurt by the Medicines; so that a new Colony of voracious Worms, which have yet inhabited their obscure World, are at their due Time brought forth from them.

8. ' NEITHER was it so difficult to find out how Worms, (if the Stories related on this Subject be true, which we shall examine in a proper Place) should be found without the Guts; since their Eggs are so minute, light and round, as they may pass through the straightest Vessels, and penetrate with the Water of the Humours all the Parts of the Body.

' If any one should ask, whether these Eggs how many soever they be, are excluded? I answer, all of them never can, but the greatest Part of them, as the smaller and those just new hatch'd are easily carried away with the Excrement, whose Force they are not able to withstand, as I have said in the fourth Paragraph. Wo to us, if all this Numerous Race should be bred, and grow up in our Intestines! then the Decease of Mankind would be too great. Since the great God hath largely endowed our Worms, with what he hath given to other Insects, Plants, Fishes, and all other living Creatures, even to Man himself, viz. an infinite Quantity of seminal Matter, which he hath distributed to all Creatures, chiefly to give us

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a Specimen of his immense Greatness and Power, not that all this Matter should bring its Fruit mature or lasting. For if every Seed of a Plant should produce its Plant; and all the Eggs of Insects, Birds, and Fishes, were fertilized; Lastly, if as many Animals were to arise from the Seed of all Animals, not excepting Man, as in Nature they might, the whole World would not be able to contain them.

10. 'INSECTS, and especially our Worms, and other living Creatures Inhabitants of the inward Parts, are endow'd, by the *most High*, with the greatest plenty of Eggs, above other Creatures, commonly called Perfect, because if there were but few of them, the Kind might easily perish. For these Insects are for many Reasons, especially their slippery and moveable Situation, forced to leave, or as I may call it, commit their Eggs to Fortune; neither can they be placed in a fix'd Part, that they may lay them the easier, or can they assist their young like other Insects, as Bees, Ants, &c. And hence it is, that they have thousands of Eggs within them, which they lay at their due Time, that if many of these perish, there may remain a sufficient Number to preserve the Species,

1. 'It may be asked again by some, why the *Foramen*, whereat these Eggs are excerned, is so small and almost invisible, in these Creatures and others of that Kind, contrary to other Females, which have very large ones destined for the same Use? First, I answer, This natural *Foramen* or Passage ought to be very streight in these Worms, by reason of its Situation; for the Place cannot bare a large Incision, whereby the very small Body of the Worm would be render'd small and weaker in its Beginning. Secondly, By reason of
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its single Function of laying Eggs; whereas other
 Creatures who have the same Passage under the
 Tails, not only lay their Eggs, but evacuate the
 Excrements at it, like a common Jakes. Thirdly,
 As these Worms are *Hermaphrodites*, the
 Coition may be in an uncommon Manner; like
 Snails, according to *Redi's* Relation; so that
 those two Organs, are neither of them admitted
 or hid in the Cleft or Hole of them. Fourthly,
 I answer, the Conjunction of those Parts in other
 Worms, may be performed by a single and mutual
 folding, and little more than a Touch, as we observe
 in Eels, Frogs and many other Fishes, which
 do not receive a stiff genital Member within them.
 In short, we can assert nothing certain, but conjecture
 by reason the Place, where these Worms
 breed and perform their Work of Generation,
 impenetrable.

12. CONSIDERING the Anatomy of both the
 Kinds of Worms, we plainly see ours are much
 stronger, thicker and muscular than those in Calves
 which in my Opinion, is the Difference, and the
 ought by all Means, since they sustain the most
 active Force of the Ferments; therefore the Author
 mightily had those Worms fortified with a thick
 Covering, that they might the better resist the
 Points of the corroding Salts in these Juices. For
 whoever compares humane Dung, with that of
 Cattle, may soon know the Strength of those
 Juices as much the greater and more durable.

WHAT this Author adds further, is a modest Excuse
 for his Style and Writing, which I shall not here
 insert. And thus much for the round Worms inhabiting
 the Intestines of Men, whereof we have taken
 Notice of many Sorts.

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Long and very small round Worms without the Guts.

BESIDES, there is another Kind of long small round Worms, like Horse-Hairs, found in the glandulous parts of Men and Brutes, such as I remember I saw in the Glands of the Oesophagus of a Dog, and like those found by *Redi*, in the Reins, Muscles and Skin of some Creatures, a Span or two long. Neither do these Worms inhabit the Guts, but are something like the *Vena Medinensis*, or Vein-Worm, which we shall presently treat of.

Worms call'd *Ascarides*.

As the *Ascarides* are the smallest, so are they the least of the Worms of the Guts, sticking to the *Anus*; whose Figure, as they are magnified in the Microscope, is given us by *Redi*. Also *Valisnerius* mentions them at the End of his so much esteem'd Work, where he refutes the Opinion of *Contoli* a Roman Physician, who places the *Ascarides*, not among the Kinds of Worms, but *Eels* and *Lampreys*: Among the other Arguments whereby this Opinion seems to be supported, this is the chief, that there appears crooked and circular Fibres outwardly in the Skin of the *Ascarides*, whereby those Worms may twist and turn themselves; tho' *Contoli* owns, they wind themselves in a Semicircle, and fall forwards. *Valisnerius* answers, 'tis sufficient if he allows *Ascarides* to move thus, since those Motions could not be perform'd without Fibres. Neither because those Fibres do not appear to the Eye, does it follow that they are not, since those Motions necessarily shew their Existence, for without those Fibres these Worms could not stir, they are so small that they

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can hardly be discern'd when those Worms are alive and fresh, tho' they are conspicuous enough when they begin to dry.

THUS this Author, adding the Guts of Redi and Contoli, shews, that the Reason of the Difference consisted in the different States of the *Ascarides*; so that those represented by Contoli, according to his Idea like Eels, smooth and without Circular Fibres, were living and fresh, and those by Redi, dead and dry. See Tab. 3. of the *Ascarides of the Uterus and Vulva* hereafter.

The Little Dragon, or Vena Medinensis, the Vein Worm, from several Authors.

IF we add to the *Broad Worm, Round Worm* and *Ascarides*, the *Little Dragon* of the Greeks, they will be the chief Worms mention'd by the *Antients*, troublesome to Men. This Insect is a very long small Worm common among the *Arabians, Africans* and *Indians*, but does not lie in the Guts, like those we have mention'd, but is found between the Skin and the Flesh. Of this Worm, Galen (*de locis affectis*, Lib. 6. Cap. 3.) says something by the by, but never that he saw it. And in Paul Agineta (Lib. 1. Cap. 59. are these Words; *In India and the Countries above Egypt, there are bred Little Dragons, Animals like Worms, in the Muscular Parts, as the Arms, Thighs and Legs; and in Children they are in the Sides, and plainly move under the Skin. But after some Time, the Place nigh the End of the Worm, suppurates, the Skin breaks, and the Head of the Little Dragon comes out. While it is drawn out, it causes Pains, and especially when it is broke. Wherefore some say, that a Lead en Weight should be hung to the Dragon, that the fall out should not be in Heaps, but in Pieces.* Others

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demning these, because by the Weight of the Lead the Worm is broke, and causes cruel Pains, order the Part to be put in warm Water, by the Fomentation of which the Worm comes out, and is drawn out Piece-meals by the Fingers. But Soranus thought the Little Dragon not an Animal, but the Concretion of a Nerve. Whether 'twas this or the other, Soranus and Leonidas used the pouring on of warm Water, and sodden'd Cataplasms of Mead and Wheat, or Barley; and sometimes approved of a Plaister of the same Kind: Also one made of Honey and Lauvel-Berries, is very good. For the using of these, the Worm, or that Body contain'd, would mortify and go away. But if upon the Suppuration, it did not go away, the Skin may be cut and laid open, to take away what was therein contain'd, and then the Suppuration might be cured.

WE read much the same Things in Aetius (*Tetrabibl. 4. Serm. 2. Cap. 85.*) but he is silent as to the Cure and the Leaden Weight, but tells of another Means of drawing it out, omitted by Aegineta, in these Words; *If the Little Dragon is drawn away it causes a cruel Pain, especially if handled too violently it is broke; for the remaining Part gives most dreadful Pains. Therefore that it should not run back again, the Arm ought to be tyed with a strong Thread, and this be renewed every Day, that the Worm by little and little coming forwards, may be included in a Knot, and not be broke.*

Actuarius says something of this Insect. But Avicenna treats most of it, (*Lib. 4. Fen. 3. Tract. 2. cap. 21, 22.*) in these Words of the New Translation of Velschius; *'The Vein-Worm is when a Blister rises in some of the Limbs of the Body, which Swelling afterwards contracts a Bladder, After that is perforated, there comes forth something red inclining to black, which continually stretches it self out. It moves sometimes like a Worm under*

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the Skin, and this Motion is so animal, and like
 that of a Worm, that some have thought it to be
 an Animal; but some again have thought it to
 be Part of a corrupted Nerve, if it happen in the
 Leg, as it for the most Part does. Yet I have
 seen it in the Hands and Sides, and in Children
 often on both Sides. If it is broke when exten-
 ded, it causes a cruel Pain and Uneasiness; and
 tho' it is not broke, the Extension gives againe
 Galen hath said nothing here, whereby it appears
 he ever saw it. He says the Cause proceeds from
 hot, bad and melancholy Blood, or an adust Flegm
 in a very dry Constitution. Since that, Water
 and some Pot-herbs breed the same, for their sin-
 gular Propriety. Hot dry Meats breed it very
 much: And according to the Matter 'tis bred from
 the greater the Pain. And tho' 'tis in 40 or 50
 Places in one Body, yet 'tis to be cured. It is
 more rare in those Bodies that use Bathing, and
 are accustomed to moist Meats and drink Wine
 moderately. It breeds mostly at Medina, and
 therefore belongs to it; yet is in Aiarvorstana, and
 farther in Arabia; also frequent in Egypt and other
 Countries.

THE Prevention consists in the Country where
 'tis generated, and the Diet 'tis bred from, and
 also in opposing those Things which are contrarie
 to its Cause. I observe it done by evacuating the
 bad Blood, by Bleeding in the Basilick or Sapher-
 nick Vein nigh the Part, and by purging with
 Syrup of Myrobalans, the Decoction of Epithi-
 mum, or Purging Pills, and by moistening the Bo-
 dy with moist Meats and Baths. But when
 first appears, 'tis well to cool the Limb, by moist-
 ening and cooling Cataplasms, after Purging, and
 the Prevention with Leeches. Among Ointments

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a Liniment of *Aloes* and *Sanders*, *Camphire* or *Myrrh*, with *Flea-bane Seed* and new *Milk* is very good. But if there is no Pain, and the Bladder remains that contains the Vein, give for three Days three Drams of *Aloes*, the first Day half a Dram, the Second a whole one, and the third one and an half, and anoint the Part or Orifice with green fresh *Aloes*. And if this does not do, 'tis proper to bind and tie something to it, to draw it out; the best is a Piece of Lead which by its just Weight, may draw it out without breaking. The best Cure is by supporting the Weakness of the Limb, and thinning it by washing with warm Water and cooling Mucilages and emollient Oils, which being gently warm and cooling, render its coming away easy. Sometimes it will not be moved with these, then we must use Liniments of *Oil of Wallflower* and *Jessamin*, with a Plaister of Pitch thereupon. If it appears, the Part must be laid open to take it out whole, if there is nothing that hinders. But if it is not to done easily by Extraction and cannot be open'd, putrify it with Butter; and when it is rotten, it will come out. But have a Care of using sharp Medicines; lest it turn to a *Phagedæna*. But if the Ends are a little, but frequently rubb'd with Salt, and the Place where it comes forth, is smoothly and gently anointed, it will come out whole. But if the Place be cut longer than it, a Probe thrust under forces it out, and by wiping and rubbing gently with a little Salt. If it breaks, hides and buries it self, without Doubt it ought to be open'd, that it may be taken hold of again, and drawn out gently, and the Place heal'd like other Wounds.

THESE two Heads *Velschius* hath explained in a learned Commentary: But we shall only observe

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here, that *Avicen* doubted whether the *Little Dragons* were *Animals* or *Nerves*, or *Fibres* of *Nerves*; and also, that he the said *Avicen* makes no Mention of this Kind of Worm, and of the others he treated of, but says here, he thought it a kind of *Apoplex*, whence 'tis likely he was of *Soranus's* Opinion; tho' he seems to own, the *Worm-like Motion* of that Vein, as he calls it. The *Arabians* certainly who gave that *Little Dragon* the Name of a Vein, until *Avicen*, might believe it to be a Part broke in living Creatures. *Alzaravius* call'd this Affection the coming away or creeping of a Vein, and *Albucasis* the Vein of the Leg. Besides, these Authors seem to differ among themselves, *Avicen* says, that which appears when the Blisters open, is something red inclining to black, and *Alzaravius* observed his Vein to be white, which Colour is said by some Authors to be proper to the Worm. *Velschius* to reconcile them with *Avicen* says, that Worms may be of various Colours, according to the Variety of the Juices, whereof they are bred and nourish'd, or that at first while fresh they may be lightly tinctur'd, on its extreme Superficies with red; but when 'tis dry'd, it disappears and becomes white; but *Avicen* speaking only of the Head of the Worm, or that Part which thrusts out when the Blisters open, and which might appear perhaps red with the Blood, is silent as to the Colour of the other Part of the Body; so that from hence we cannot tell what is the true Colour. Whatever it is, the *Arabians* call it a Vein, tho' 'tis a real Worm call'd by the *Greeks* very properly a *Little Dragon*, because 'tis of the same Length with *Dragons*, and also round like them, and of the same Size and Bigness. *Amatus Lusitanus* saw a *Vena Medinensis* taken from a *Black's* Leg three Cubits long. *Abulcasis* whom the Translators call *Abucasis*, Chap. 9. found

them to be five, ten, and sometimes twenty Hands long ; therefore Actius ought to be explain'd, who mentions little Dragons, both large and small. Velschius's Words de Vena Medin. cap. 3. pag. 79.) from whose Work it will not be amiss to describe the Observations of three European Travellers, that we may know this Worm the better.

‘ ON the Shore of *Capocors*, one *Abraham Heinselius*, who had lived above Ten Years in *Guinea*, being taken, as it were, with a Fever, first with an Horror and Coldness, and a Heat succeeding, broke out all over his Body in little Blisters, which breaking, were soon discuss’d. But being at the next Town, not far from the Castle of *St. George*, he found that two Pustules or little Blisters on his right Leg about his Ankle, which contracting a Bladder, soon broke, and a Worm or *Little Dragon*, that lay there, rais’d out its Head like a small Needle, which was laid hold on by a *Dutch Surgeon*, who slitting a Quill, put it between, and by continually turning it round, drew it out while the Patient felt any Pain. So that in two Days Time the one was brought out by little and little whole. But the other broke, and caused a Swelling in the Leg, and cruel Pains. That which came out whole was above an Ell long, and small as Cat-Gut, when ’twas fresh, white, but when dry’d, something yellowish, and being stretch’d out, sounded like a Fiddle-String. The Surgeon who did well understand this Disease, used only *Basticon* and *Diapalma*; yet by these alone he happily perform’d the Cure. The *Blacks* otherwise used a small Wood to draw it, and to cure it only with *Oil of Palms*, or *Chermes*, which they have very plentiful. He had lived there three whole Years, before he had contracted this Distemper, which is

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common to the whole Country, and is thought to arise from the Waters.

To this *Velschius* adds the Relation of *Michael Hemmersamius* in these Words; 'They who go to Guinea, and live in the Castle of St. George, whose District reaches some Miles, are wont to be troubled all over their Bodies with Worms, but more the Native *Blacks* than *European* Strangers. 'Tis a worthy Observation, that if any one only sails by that Coast, he feels an Itching in his Skin, especially in his Arms and Legs, and often in his Thighs; then there arises a little Bladder, the Bigness of one and in some three Pease. This, unless 'tis pierced by the Worm it self, ought, when the Surgeons, who are very expert in this Matter, think it ripe enough to be open'd. As soon as 'tis done, there come forth two white Hairs fix'd to the Head, and therefore are call'd the *Worms-Bears*. The Bladder is fill'd with Water; then the Worm is drawn out Morning and Evening. In the Muscular Parts of the Body, if 'tis above the Length of the Joynt, it often comes out at one drawing. They are an Ell or a Cubit and an half long, white and very cold, tho' they come from warm Flesh, as small as a Thread, and others as thick as a small Cord. The thickest are the most venomous and the worst, and are difficult in the Extraction. In the lower Part of the Leg, they are often wrapt round the Nerves and Veins, and then cannot be brought away without breaking. When they break out in the Feet, a great Swelling suppurates and gathers a Matter until it breaks out in an Issue, or an Incision is made, where more of these Points appear, and cause great Pain. I my self while I lived there, labour'd under three of these, two in my right Leg, and one

my left. Foot, which could not be brought away. The third came forth about the third day, and back again. so that it be cured. it could not be cured. The other with a half a a Year after he was away. T without so much theless wh The *Blacks* drawn the it off, and fresh Leaf a Plaister Sanies and wards the other Her to it to m use for all THUS far that of *Blom* who travel bred in Whites, nig as they w wards the Those Wo

my left. The first was in the Sole of my right Foot, whereupon I lay in Bed fourteen Days and could not walk till it broke and dry'd. The other was below my Ankle, which was very painful; and the third was under my left great Toe, and came forth above half an Ell long, but breaking return'd back again into my Leg, which swell'd thereupon, so that I was ill for four Months. Neither could it be cured without cutting, at which Time I could neither stand or go, but was always carried. The Cook of our Factory was troubled longer with thirty of these Worms, keeping his Bed half a Year, that his Life was despair'd of, but after he was cured of three or four, the rest went away. Tho' there are few who come from thence without this Disease, yet there are few who are so much tormented as that Cook was. Nevertheless when I came away he was cured and well. The Blacks cure themselves thus; When they have drawn the Worm out a Finger's Length, they cut it off, and apoint it with *Oil of Palm*, and clap a fresh Leaf of Palm-Tree on the Tumor instead of a Plaister; after 'tis open'd they let the purulent Sanies and Matter flow, and so are well: Afterwards they wash it with a Water of Pepper and other Herbs, and then put *Oil of Palm* and a Leaf to it to mitigate. And this is the Remedy they use for all Sores.

THUS far *Hammershamius*, from whose Relation that of *Blommertius*'s differs. 'First, (*says he*) those who travel into *Guinea*, are seiz'd with Worms bred in their Body, not only the Blacks but Whites, nigh *Meina*, and the Parts adjacent, whereas they who live Five and Twenty Miles towards the *East*, are not troubled with them. Those Worms which in *Their Tongue* they call *Ickon*,

' *Ickon*, is not common to all who go there, but
 ' only to some. For some are troubled with them
 ' for four, five, six and twelve Months, some while
 ' they live on the Golden Shore; others in their
 ' Return, and others after they have perform'd their
 ' Voyage. There are some again, who have been
 ' there three Times, and never heard of these Worms.
 ' Some assign the Cause to Venereal Encounters;
 ' others to Swimming and Bathing in cold Water.
 ' Some say it hath its Rise from Drinking too much
 ' Palm Wine, and eating Bread made of Millet
 ' But all these Reasons do not seem very consonant
 ' since those who have had nothing to do with Wo-
 ' men, never tasted of those Fishes, or that Bread or
 ' Wine, nor gone into the cold Water, yet have
 ' been afflicted with this Disease of the Worms.
 ' when on the contrary, they who have conversed
 ' with lewd Women, and been often drunk with
 ' Palm-Wine, have felt nothing of it. Therefore
 ' it is more likely to proceed from some Maligni-
 ' nity of their Air or drinking of a Water which
 ' the *Negroes* fetch from a Spring, and sell to the
 ' *Whites*. But many Strangers on this Golden Shore
 ' have drunk plentifully, who never had this Di-
 ' sease. But those who lie at *Mourea*, or drink much
 ' Water, labour more frequently under those Worms
 ' than those at *Acara*, or the upper Parts. This
 ' Distemper takes People variously, some with a
 ' Fever and Chilness, others with a Weakness, Swoon-
 ' ing, or great Anxiety, and some with Deliriums.
 ' First a small Bladder or Pustule appears like a Flea
 ' bite, or a Swelling wherein a Worm may often
 ' times be seen, lying between the Flesh and Skin,
 ' or a Springing of the Blood, and such like Sym-
 ' toms; for the most Part in the Fleishy Parts of the
 ' Legs, Arms, Knees and Buttock, and in all the

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Fleshy Parts, and sometimes in the Scrotum where it gives cruel Pains, and sometimes none at all. Some are tormented with them three Months, and others hardly three Weeks. They are in some Persons but one, and in others again Ten at once; and are of different Lengths and Sizes; some two Ells long, some one, and some shorter. Some are as thick as a Fiddle-string, and others as fine as Silk. Many will not believe that they live and are Worms, but take them for corrupted Nerves; but they are found to be otherwise by their Motion when they come away. The Cure is seldom perform'd before the Worm comes away, or puts out its Head, which is taken hold of, and held, that it should not go back again, and afterwards is drawn out. To draw it out, is to wrap it round a Piece of Stick that it should not draw it self in again; and by drawing at Times, it at last comes out, but if too hard is very apt to break, and is follow'd with an Inflammation. When it comes away, it brings a great deal of Sanies and Matter with it. The *Blacks* never stir their Hand, but bear it calmly, and wash the Wound with Salt-Water. The best Way is to cleanse the Body from the putrid Sanies, and to anoint the Sore with fresh Butter. The Part where this Worm shews it self ought to be kept warm and preserved from any Cold, lest, as it has been observed, the Wound tumify and be inflam'd.

To these Observations taken from *Velschius*, I shall transcribe another of *Lachmund's*, from his *Miscellanies Decur. 1. Year. 4.* 'When I came into Guinea, I saw the Inhabitants, having Pieces of Wood hanging on their Feet, on which something was rowld. When I ask'd the Meaning of them, they answer'd, they were Worms, which bred there

there in the Feet, Loins and Scrotum of the inhabitants. By those Pieces of Wood, they said they drew out Worms often three, four, or five Ells long. When I came to the Castle Mour where our Men were garrison'd, I enquir'd farther after the Nature and State of these Worms. They said they were not painful, but when they perforated the Skin; then a Coldness proceeded the Part grew red, like an *Erysipelas*, and then came out a watry Matter flowing before them. Then two little Horns as small as Hairs, and of the Length of a little Finger's Breadth appear'd. Afterwards the Head, which is somewhat press'd and then the Body, which is as round and small as the Fourth String in the Bandore; which drawn out gently, and by Degrees three Times a Day, about a Finger's Length at a Time; and wrapt round a Stick; but Care must be taken that 'tis not drawn out too roughly, lest the Worm break; for then a sharp Humour flows, which in Sores causes great Pains, and by it great Heat occasions, without great Care, a Gangrene. And observed, that the Soldiers who were in the Dutch Service, after they had been there two or three Years, were likewise troubled with these Worms.

THESE Observations contain whatever may be said of the Nature of the little *Dragons*, their Symptoms and the Remedies against them; and in the two former their Colbur, concerning which we saw the Dispute, is said to be *white*; but the third and last affirms, that they who did not reckon those *Little Dragons* Worms, but corrupted *Nerves*, were mistaken, since their Motion shews the contrary. We may infer from the first and second, that they were certainly Worms, and in the last there is something particular, omitted by the others, that they had

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white Hairs on their Head, which were call'd the Worms Beard, which puts me in Mind of the like Hairs observ'd in the Head of the *Tania*. From the first of these Observations we learn that the Body of those Worms, tho' as small as thin Cat-Gut, was very firm, since when it was dry and stretch'd out, it sounded like a Fiddle-string. Lastly, these Observations have not left unmentioned their various Lengths and Thickness; but of their Size and Thickness we shall have Occasion to speak by and by. As to their Form, *Velschius* compares them to a Worm of a Foot long, found by *Spigelius* in the Hip or Thigh of a Linnet, and to such like longer Worms found by him in the Liver, Intestines, Kidneys of Larks. Also more modern Physicians have observed many such Worms in the Kidneys, and Glandulous Parts of Men as well as Brutes, and in the Muscles of some Animals, as we shall see hereafter; but it does not follow, that they, from this Similitude of the outward Form, should be all alike in the inner, as we learn by the Example of other Worms already mention'd, which at first Sight, look'd like some others, but as to the Structure of the inward Parts were found to differ very much.

WHAT *Andry*, in his Book of the Generation of Worms, observes of the *Little Dragons*, is very strange, viz. That they have two Heads (not placed on each side of the uppermost Part of the Body, as those of *Medi*, in his Book of Animals, living within others, devourers in a monstrous Snake he saw) but placed at both Ends, such, as he says he has observed in Cancer-worms; adding, that one of these Heads always remain'd dead, and the other alive. This indeed is wonderful, if true, but this learned Man too easily gave credit to this Narration. Neither were there ever seen Canker-worms with two Heads thus situated; tho'

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tho' there are some Insects, as for Example the Caterpillar, which invert the Motion of their Fibres at their Pleasure, and go as easily backwards as forwards, as if they had an Head at each End, which *Valisnerius* observes in the Gourd Worm Chap. 6. The same thing is taken Notice of by the Ancients in the Serpent call'd *Amphisbana*, of which *Pliny* says, (Book 8. Chap. 33. *The Amphisbana has two Heads, one at the Tail, as if it was not sufficient to spread out its Poyson at one Mouth.* See *Harduinus's* Remarks on this Place. So a kind of Serpent in *Brazil* call'd by the Portuguese, *Cobe de dos Cabeças*, seems to have two Heads. See *Piso's History of India*. Book 5. Chap. 7.

WE learn from what hath been already said, that the Little Dragons are often obnoxious to Men in *Arabia*, *Guinea*, and the *Indies*; but we will inquire whether these kind of Worms are found in *Europe*? *Antonius Guenotius*, an eminent Surgeon of *Paris*, says they are sometimes, whose Observations according to *Velschius*, (pag. 311. 312) are these; *A Holland* who was brought to *Rochelle* by *Want*, complain'd of Pain and Inflammation in both Ankles, and telling a Surgeon of it, he said they were Worms, and applied *Galen's Sear-cloth mix'd with a little Basilicon* to the Inflammation, whereupon two Worms or Nerves thrust out one of each Ankle. These the Surgeons drew out while the Patient complain'd of Pain, then he tied what was drawn out in a Knot, and repeated this every Day, till it came entirely away. But whether 'twas Worm, Nerve or Ligament, it shew'd no Likelihood of Life. And *Guenotius* mentions, that he saw another of *Monalban*, who labour'd under the same Distemper, which was brought also by *Want*, but the Event was different; for the Surgeon in the Extraction used too much Violence and broke it, whence follow'd Pain, Inflammation, Convulsions, and

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24 Hours, Death. Upon opening the Body, the Peristomium to which that adhered was inflam'd: Whatever was, it was twisted at the Ankle in five or six Circles, and from thence reach'd to the Knee, where again it bent in Circles, and extended it self to the Hip-Bone.

THESE Things are wonderful, if true. Secondly, it may be doubted, whether these two Men, who perhaps might have come from *India* and other *Eastern* Countries, did not bring this Distemper with 'em, and it might lie hid in the Body, and then appear, as *Blomertius* takes Notice, Some used not to receive this Disease in *Guinea*, but at their Return, and some 5, 6, or 12 Months after their Voyage.

OF this *Wepferus* gives us a remarkable Example, *Miscellan. curio. Decur. 2. Ann. 10. Observ. 71.* 'I cannot, says he, but add here, what I have seen, and heard of these Worms. In the Year 1652. I met with one *Antony Cromer*, a skilful Surgeon, newly come from the *East-Indies*, and *Guinea*; at which Places he had been twice, and had stay'd a long Time; once five Years, and the other Time six. He was in an ill State; his Face bloated of a yellow pale Green; his Feet swell'd, and he entirely languid. He had two of these *Little Dragons* under his Skin, the one on the outward Part of his left Leg, just by the Ham, the other on the outward Ankle of the right Leg. In both Places the Worm perforated the Skin, and a Piece of them hung out about two Inches, like a small Fiddle-String. He handled them both gently; for once before being weary of its slow rising, when he pulling it with Violence, broke it from the other Part of the Body, and the remaining Part caused him such cruel Pains, that he was forced to keep his Bed a Month, with continual Walkings and an intense Thirst, which was not to be
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' asswaged but with Spring-Water; he shew'd
 ' the Piece dry'd, about two Spans long, in Sha
 ' and Colour like a small Fiddle-String, but v
 ' fragile. He said they lay under the Skin for so
 ' Months, and sometimes Years, without any gre
 ' Trouble, and come away only like any Creatur
 ' creeping; but if they are irritated with any v
 ' lent Motion, Touch or Blow, the Pains exceed
 ' Gout, and sometimes they are all of one Colou
 ' He added, that after they have laid there a lon
 ' Time, they come away of their own Accor
 ' being preceded with a painful Inflammation,
 ' the Midst of which there rises a little Bladder
 ' upon the breaking of which they come away b
 ' Degrees. If they be irritated by drawing, the
 ' presently swell, dye, and dry, the Piece left ali
 ' behind causing cruel Pains. By applying mat
 ' rating Medicines to the Bladder, promotes th
 ' coming away. 'Tis seldom observed, that the
 ' die under the Skin, and also by Mercurial Oin
 ' ments. In some Bodies he open'd, he saw tho
 ' Worms twisted round the Nerves and Tendon
 ' several Times, which Worms he protested we
 ' two Ells long.

THERE is, besides, another Observation of the *V*
na Medinensis extracted in a Northern Countrey b
Wagnerus in his *Journals of the Baltick in the Year*
 1698. in February, who, says he, found in the right
 Leg of a Man who had been often at the Indies, a new
 vious Body, of the Thickness of a little Finger, twisted s
 veral Ways, and very like an Earth-Worm, which, h
 says, the Person told him suppurated about the End, and
 open'd the Skin with grievous Pains. Indeed this Kind
 of Little Dragons was very singular; tho' *Aetius*
 writes, as we have seen, that some were small and

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others large, which *Velschius* would have understood to their Length; but those Worms differ in their Thickness, so that some are as thick as a small Cord, or the thickest Fiddle-Strings, and others as small as fine sewing Silk, according to the Observations of more modern Travellers: But that of *Wagnerus's* was the thickest of all. Perhaps that mention'd by *Solterfohtus* might be of the same Thickness, which, he says, was presented him by a Surgeon who had lived in America, Seven Years, and was very like the broad Worm, harden'd in the Sun. Thus much for the *Vermis Medinensis* or Little Dragon.

Of the Little Worm causing the Bovine or Ox-Affection so call'd.

NEITHER in these our Countries, is the Disease, which the *Arabians*, or their Interpreters, call the *Bovine* or *Ox Passion* or *Sickness* less frequent, tho' not touch'd of by the *Old Greeks*. *Avenzoar* speaks of it in these Words, (*Book 2. Tract. 7. Chap. 20.*) 'There is bred sometimes between the Skin and the Flesh, a Worm, and this Passion is call'd the *Ox Sickness*, because for the most Part, it belongs to *Oxen*, which if not kill'd, is very hurtful. Therefore when you know this, as soon as it appears, burn the Part with an hot Iron, so that the Heat may reach the Worm and kill it. Then cure the burnt Parts as you would cure other Burns. Lay on it Lint mixt with Barley-Water and sweet fresh Water, and add something sharp in so small a Quantity that it may not bite; but may search the burn'd Place, and when the Pain's abated, anoint it with Oil of *Olives* and of *Roses*, till the Swelling goes away; then wash it with Honey-Water, and sprinkle thereon Powder of *Roses*. If any of the Flesh

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' is waſted, lay on the *Ointment of Alder* to incar-
' nate, and *Powder of Roſes* to consolidate. Theſe
' Remedies are good for all Burns. But if the Pa-
' tient is afraid of Burning, take of the Meal of
' Lupines, Soot, Pepper and Skirret-Roots pounded
' equal Parts; moiſten them with with *Alchitran*, a
' kind of Spirit like that of Wine; and put this Con-
' fection in a Nut-shell, and apply it to the Part, ſo
' that the Worm may get in farther, and continue
' it until it is kill'd, and purge with the ſame Me-
' dicines as in the *Vena Medinenſis*.'

OF this Diſeaſe *Albucasiſ* writes thus, (*Book 2*
Chap. 93.) ' This Diſeaſe is call'd in a Part nigh
' us, the *Bovine-Sickneſs*, from its being common to
' Oxen; and is one ſmall Worm bred between the
' Skin and the Fleſh. It goes through the whole
' Body from one Part to another until it breaks out
' 'Tis bred from the Putrefaction of ſome Humour
' like the Worms and *Ascarides* in the Belly. And
' 'tis dreaded for its Maliciouſneſs; for when
' moves towards the Head, it opens in a Part where
' it ruins the Eye, and this it does frequently.
' is not to be cured and extracted before it move
' about and appears. There the Part above and
' below it muſt be tied tight; afterwards make a
' Inciſion and take or draw it out. But if it lie
' deep in the Fleſh, and you cannot find it, uſe
' Searing-Iron. Beſides, that which is moſt fear-
' is its Corruption, which corrupts the Eye, as we
' have ſaid before. But if you ſee it come in to
' Head nigh the Eye, bind the Eye-Brow under
' and make the Inciſion, and draw it out. But the
' Patient ought to uſe Evacuations with looſeni-
' Medicines to purge the Body of the ill Humour
' and to avoid Meats that engender Putrefaction.

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Alzaravius treats of the same Disease thus, 'It is call'd *Passio Bovina*, because it is bred in most *Black Cattle*, and is a *Worm* generated betwixt the *Skin* and *Flesh* of a Man, creeping about the whole Body till it perforates the *Skin*, and goes out where it happens, and it is possible to happen that the Eye may be lost by its Exit. There is of this kind of *Worm* whose Head is black, and which proceeds from the same Sort of Humour as *Lice* and *Nits*. But this Humour is putrified under the *Skin*, and 'tis possible to happen to some Men in some Countries.' The Cure prescrib'd by our Author consists chiefly in Purging and hot Baths. The Chirurgical Method is the same as that deliver'd by *Avenzoar* and *Albicasis*. Thus far the *Arabian Physicians*.

BUT what is the other Disease mention'd in a late Dissertation of the learned *Valisnerius*, under the Name of the *Brye*, *Brimsee*, or *Wood-fury of Oxen* and *Cows*. This Madness is a Sort of Fly that fixes in the Backs of *Oxen*, and with a certain Sting or Point clings to the hinder Part of its Body, perforating it in the several Places, as it were with a *Piercer*, into every Hole of which an Egg is introduced from which a *Worm* sometime after proceeds, and that very Fly, like its Progenitors, in proper Season, begets another, and so on. The Herd of Cattle strangely dread this Deadly Fly, that pierces so deep into their hard Skins, causing there the sharpest Pain, and therefore they avoid it with all their Might. Yet the *Worm* being deposited by it, grows there, and that without any apparent Detriment to the Health of the Beast. Nay, the Herdsmen fancy those *Oxen* sounder than the rest, where the *Worm* has fix'd it self; not does it creep

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elsewhere, or is mov'd from Place to Place, but where it first settles, there it rests quiet all the Winter: As it increases, a Tumour begins to appear in which it is hid, which by Degrees so dilates itself, that it may remain there till it comes to its destined Size as an *Insect*, which when it has gotten the next *Summer*, it breaks Prison, turns Butterfly, and is gone.

American Worms that are troublesome to Mens Feet.

THAT the Distemper of Oxen differs much from what the *Arabians* mention'd of that which Men are subject to, because in this the said Worm does not stay in a Place as that which infests Oxen does, but turns about, and creeps every where. I find nothing produced among our modern Travellers worthy remembring, except what we meet with from the *American* Writers of certain minute *Insects* said to be in all the *American Islands* call'd the *Antilles*, as *De Rochefort*, a *French* Author sets forth in his *Natural History* of those Parts: 'The *Cirons* saith he, are much to be dreaded that are bred in Dust and Ashes and other Filth, which they commonly call *Chiques*. These chiefly insinuate themselves into Men's Feet, and under the Nails; and if they are not soon got from thence, or permitted to go farther, will convey themselves to all the other Parts of the Body. At first they raise a slight Kind of Itching, but where they have penetrated the Skin, the Part begins to be inflamed, and those small ones which have penetrated, increase so by Degrees, that they equal the Size of a Pea, and produce many *Nits*, from which likewise many other *Ciccons* are bred; and sometimes ugly *Ulcers* are raised in the Parts from whence the

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are drawn out. The *Natives* tell us, that those who are used to them, have a certain Gum with which they anoint the Feet, especially the Toes under the Nails, to preserve them from these *Insects*. But those who want or are ignorant of this Secret, as soon as ever they perceive the least Itching, apply themselves to some skilful *Indian*, who knows how to extract them. But they ought to take Care who draw out those *Chiques*, lest they tear or break the Bladder in which they are, for if this accidentally happens, some of their Eggs will always be left behind, whence the like *Worms* afterwards breed. Some there are who believe, that the Juice of a Fruit that grows upon a Tree call'd *Roucon*, will preserve them from those *Insects*. 'Tis serviceable to wash with Salt-Water, and to avoid going with your Feet naked, also to make Defensitives for the Shins, of the Skin of a *Rock Goat*. But thus far Cleanliness is useful, that few are much troubled with these Vermin, that take Care of themselves and avoid Nastiness. These troublesome *Insects* are call'd by the *Brasilians*, *Tous*, by some other *Indians*, *Nigas*.

Piso treats of the same; 'Several Parts of *America*, saith he, are subject to these minute *Insects*, which by the *Portuguese* are call'd *Bicho*, and the *Brasilians*, *Tunga*, or *Tous*. They are bred frequently with Itching, but rarely with Pain in the Extremities of the Toes; and chiefly before all others, plague those who walk bare-footed upon Sandy Places, especially where it is hottest, they delight to live invisibly, and avoid Floors that are pav'd with Stone. At first they lurk some Time in the external Skin, afterwards penetrate it with excessive Itching, especially about the Soles of the Feet, and the Palms of the Hand, and

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there they will hide themselves. The Remedy for
 Precaution Sake, us'd by the *Portuguese* and *Brafil-*
ans, is to anoint the Soles of the Feet with a Bi-
 ting Oil made of the Acorns that grow to the
Acaju Apples, which is extracted from the unripe
 Fruit, that the Quality thereof might be the more
 acrid. They also use the Tears of a Yellow Tree
 call'd *Camacari*: But we see the *Maritime Nations*
 outdo them with *Ship-Pitch*, and the *Fat* of some
Fish, from the Stench whereof they fly and perish.

*The Worms call'd Syrones, which procure Death;
 also those of the Eyes.*

Moufett himself gives us an Observation of a Di-
 sease, not much unlike the *Syrones* met withal in
Europe: 'How cruel is the Disease, saith he, which
 the *Syrones* excites, and may be compared with
 the *Phthriasis* it self. He knew a Woman of Fa-
 shion, who was of an *English* Family and the Wife
 of a Knight, by the Name of *Penruddock*, of Sixty
 Years of Age, that by too excessive Drinking of
 Goat's Milk, fearing a Consumption, had her
 whole Body pester'd with these little Vermine,
 which Night and Day miserably afflicted her Eyes,
 Lips, Gums, Soles of the Feet, Head, Nose, and
 the other Parts, so that she led a restless uncon-
 fortible Life, till at last, Medicines failing, the
 Disease increasing, and the Flesh being total-
 ly emaciated, she died. But this is not to be over-
 look'd, that the more diligently and deeper the
 Women dug into the Body of the Dead with their
 Bodkins, a larger Stock or Succession follow'd, and
 when they had eat the Flesh off, they appeared
 to be of a much larger Size. It seems impossible
 to addeth *Moufett*, that the *Syrones* should breed

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tween the Eyes. But we have seen it may be so, from *Le Jeun's* Epistle to *Jacob Guillemaus*. You know, saith he, that in the Conjunctive Membrane or White of the Eye, as 'tis commonly call'd, some of the largest of the *Syrones* rais'd such an Itching upon the Part, that you could scarcely abstain from scratching. In this Case I prescrib'd Remedies that I had us'd against the *Phthiriasis*, but without any Advantage. Then Friends sent to the Patient a certain Person who with a Silver Needle or *Bodkin*, so dextrously extracted the *Syrones* without Pain, that it appear'd miraculous to me: And without I had seen these Brutes going, I had never believed them to have been *Syrones*.

Many other Worms, either scarce, monstrous or fabulous.

WE have already taken Notice of all *Worms* that the Ancients had observed, and added some others of the *Ascarides*. But if we will regard the Modern Physicians, there is no End of human Misery in this kind; for there are six hundred other new Sort of *Worms* or *Insects* of various Forms, which do not only infest the *Guts*, but almost all other Parts of the Body. But here is a just Occasion for Caution and Judgment; for if all those Things were to be admitted blindly and without Distinction, both Natural and Medicinal History would be eternally stuff'd with idle Stories; such as those of *Serpents*, *Frogs*, and *Snakes* being brought away alive by Stool, if we believe *Montuus*, *Rulandus*, *Gemma* and others: But of these and other such like Fables, *Valisnerius* hath given us a Catalogue, to make them ridiculous to all Men. The gravest Authors may write frivolous Narrations of this Kind, tho' they do not seem presently to agree with some *Worms* or *Insects*,

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either monstrous or extraordinary, that are brought from human Bodies. Yet all these, before they are received for Certainties, are diligently examined by us, since those Writers, tho' learned and honest Men, may be drawn sometimes, thro' too much Credulity, or too little Attention, into Mistakes.

Insects coming from without, are sometimes believed to be bred in the Body.

BUT here are two Causes particularly assign'd by Authors, especially *Valisnerius*; and first indeed, the Matter may extrinsically fall into the Chamber-Pot, as several Sorts of *Insects* sometimes have done, and been found there mix'd with the *Stool* or *Urine*, which some have rashly believed to be voided or discharg'd from the Body: Of this kind were the *Beetles* which a Noble Matron, from whom the said Learned Author mentions in his Writings, it was believed they were voided with a *Clyster*, when they were in the Chamber-Pot before, entring there from a low damp Room, wherein that Utensil was placed.

Worms excreted with the Urine.

OF such like *Insects* being voided by the Urine, if Faith or Credit is to be given to some Authors, whether the same Judgment is to be made, ' *Lewin* ' *Duret*, a Man of Learning and Integrity, saith ' *Ambrose Parey*, told me, that he voided thro' the ' *Urethra* with his Water after a long and dangerous ' *Sickness*, a living Animal, of a red Colour, and as ' to the rest, like an *Hog* or *Wood-Louse*.' *Tulpius* exhibits some *Insects* of a Figure not much different from this, that were discharg'd by Pissing; and others happening to *Ascarides*, voided likewise by a

Woman.

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Woman. *Rondeletius* also witnesseth that *Hair-Worms* were shewn to him in Urine. *Cardanus* says, he piss'd the like white Worms that were short and small, and not half the Size of a Louse, but lived a long Time. And there are many other Examples of Worms of the like Nature, voided with the Urine, a great Part of which are said to be like *Ascarides*, *Palmer-Worms*, and that sort of small Worms, or they are not described, whereof see the *Miscellanea Curiosa*, and other Books of Physicians. Therefore whether all those Authors believed the Insects coming otherwise, which fell accidentally into the Pot, that they were produced or bred in the Bladder or Kidney, the Thing not being sufficiently known? or whether that kind of Worms are really brought from the human Body? Such is the Number of Witnesses affirming all these Particulars, that we ought not to invalidate or lessen the Credit of any of them. Yet as we may believe that the Worms coming in Pissing, are ejected with *Ascarides*, *Millepedes* or *Palmer-Worms*, we cannot therefore allow Monsters or other Animals, whatever to be discharged this Way. I suspect that Worm like a Loast or Bird, and I know not what, voided by Count Mansfield, with his Urine, the Effigies of which is given us by *Paræus*, who was an excellent Surgeon, but too credulous, and therefore a greedy Hunter after Monsters; but such an Animal of the winged Kind of Insects might easily fall in the Chamber-Pot and be mix'd with the Urine. The same cannot be said of another Worm, and that a monstrous one, of which *Argentarius* speaks; 'I saw at Lyons in *Raphael Parnisius* a *Genoesse* in the Year 1533. after he had labour'd and died of a Pain in his Kidneys, upon the Dissection of the Body, a Little Dragon with Wings and Tail, a Worm so call'd in his

his *Kidney*, of the Length of a Man's Finger, which *Rondeletius* relates from me.' But *Rondeletius* relates that *Argenterius* asserted he himself had seen that *Dragon* furnish'd with Wings, voided by *Urine*. *Androvandus* also found this *Dragon*, but not in the *Kidneys* of one Dead, but excreted with the *Urine* from a living Subject. Now if *Argenterius* had said that it happen'd so, we might have suspected there was the same Occasion for his Error, as there was for that of *Paraus*, but he ought rather to be believed who takes that Part wherein the Body was found resembling a *Dragon*, which the Learned *Valisnerius* thinks to be of the *Polypus* Kind. The two black *Worms* likewise seem equally to be rejected with the sharp Head, horned, and the Back and Belly cover'd with a Shell, except that they are little reddish on the Belly, from a certain calculous Matter, which the *Scholiasts* of *Hollerius* assign to the *Urine*. So the *Worms* of *Duretus* and *Tulpius*, which in some Measure are said to be like *Millipedes*; but those Authors are silent about their Shells. Nor do I think within the Body of Living Insects any of the same can work in a hard Case or Covering; that the *Worms* of *Hollerius* might perhaps be join'd to the *Beetles* mention'd by *Valisnerius*. But what shall we say of other *Worms* which *Ludovicus Bonaciola* says are found in the *Urine* of Breeding Women. The *Urine* of a pregnant Woman well stopt in a Glass-Vessel, some will keep it in the Shade for three Days, then strain and filter it thro' a Linnen Cloth; in which, if you find the minutest Animals like that of a *Louse*, they plainly demonstrate a Conception, which if reddish are *Males*, if white, *Females*. What Trifles are these!

HERE we must not omit *Worms* of a different Kind, which the famous *Ruyfch* saw voided with

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the Urine, and talks of in his *Anatomical Thesaurus*. The Fourth Chest or Cabinet, saith he, is composed of the smallest *Flies*, as the *Skins* or *Pellicles* of the *Maggots*, from whence the *Flies* are excluded; but these *Nympha* or *Maggots* are driven out with the Water by the Urinary Passages. A certain Nobleman, continueth the same learned Author, being troubled with an Itching in his *Perinaum*, and a grievous Excretion of Urine, call'd in a Surgeon, and a few Days afterwards sent for me. We found the Urine not altogether sandy, but mix'd with little Oblong roundish Particles, resembling Grains. Having seen these Things, I desired the Patient that he would let me carry some Home in a Box, to make further Enquiry, which he consented to: But when I open'd the Box the next Day, I found an innumerable Quantities of *Flies*, as well as *Pellicles*, from whence they issued. Amazed with these *Phænomena*, I made Use of my *Microscope*, and so distinctly found, that the said Particles were nothing else than *Maggots* which produced those *Flies*. But all *Flies* will live spread in a Box, and some will fly; one among which yet sticking in its Shell or Skin, put me past all Pretence of Doubt. Some perhaps will say, Whence such *Maggots* in the *Perinaum*, and indeed in the Neck of the *Bladder*, where they will stick before Excretion? The Answer is, since the *Urinary Duct* is a Passage so open, I scarce think it necessary to have Recourse to other ways less apt or proper. It is very probable, that by this Way the smallest Worms insensibly enter and stick about the Neck of the *Bladder* till they get the Form of *Maggots*. Thus far this eminent Writer, whose Observation is lately confirm'd by a like Example from the learned *Valisnerius*, who promises to write

write more of these Kind of *Worms*, where he is certainly convinced by his last Observations of the Truth of the Thing. But such *Worms* may give Rise to several small *Flies*, situated within the Uterus of the *Sheep*, or those which penetrate to the Neck of the *Bladder*, by the Way laid out by *Ruyfch*. The Example of other *Worms* found in the Head of *Weathers*, *Goats*, *Deer*, &c. prevail, as also in the Belly of *Horses*, and the Skin of *Cows* and *Oxen*, beside what attacks them from without, of which consult *Valisnerius's New Observations*, &c. Yet this happens worthy Notice, that the Distinction between the *Worms* observed by those Learned Men in human Urine, and others that are troublesome to *Weathers* and *Goats*; that these frequently attack Brutes, and the others are seldom said to disturb Men.

The Worms of Ulcers or Abscesses.

IN the external Parts of Human Bodies, *Worms* are sometimes found, which are believ'd to be bred in them, altho' they cou'd equally be suppos'd to come there from without. 'A Young Man, said *Paræus*, in the *French Edition*, for 'tis not to be found in the *Latin*, had an Impostume in the Middle of the *Thigh*, on the Outside from which proceeded this Animal, which was brought me by *Jacob Guillemaus*, Surgeon in Ordinary to the King, who would have me take it, which I did, and put it in a Glass-Vial, and it continued a Month, living without any Food; the Figure is there presented.' That Animal, as exhibited by the Author, from his Figure wou'd persuade us, that it was of the Hundred-Footed Kind, and not bred in the *Thigh*, or the Impostumation therein, as he him-

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self believed, but as it were attracted from without the *Apostem*, by the stinking Odour of the Pus, and the corrupted Flesh. The Original sometimes is not unlike, to wit the external One of Worms found in foul neglected *Ulcers*, namely from the Eggs of *Flies* laid in those *Ulcers*, or from the oint and *Plaisters* applied to them. There are others that are bred otherwise, tho' they supply *Ulcers* with Worms, yet these do not exclude the External Kind; neither have they any Thing common with both or either that prey upon the Human Body, with a filthy horrible Disease, such as are said in *Sacred Writ* to devour *Herod*, and as *Pliny* attests, *Sylla* the Dictator, and *Alcman* the Poet: For those Worms have been call'd *Ferales Pediculi*, Deadly or Mortal Lice by *Cæsar Aurelianus*, acting in this Disease according to the Nature and Kind of Lice.

That Things inanimate like Worms, among which are the Polypus, found in the Head, Blood, Vessels, and other Viscera, give farther Occasion for Physicians to mistake.

INANIMATE Things likewise furnish the Physicians with other Occasions to err, of which there is a strange deceitful Likeness among Worms; its connected Humour, for Example taking the Form of any Worm or Insect, especially with the Help of the Spectator's Imagination, shall afford you as many Monsters as *Africa* it self. So the wonderful Snake *acutus Lusitanus* mentions to be found in the left ventricle of his Heart, was nothing but a *Polypus* of the Heart, as will plainly appear, if we observe the Authors own Words; 'An Englishman of Quality, says he, of One and Twenty Years old, dying at London, in the Parish of St. Giles, whose Body

' dy being opened, there was found a little Snake
 ' the left *Ventricle* of the *Heart*, the rest of the B
 ' dy being white and clean; the Head of this Cre
 ' ture was red, and the Tail double forked, and
 ' every Branch of the Tail there seem'd to be a Qu
 ' dripartite Division. This Youth three Years b
 ' fore his Death was perpetually overcome wi
 ' a great Pain and Heaviness at his Breast, tendin
 ' to the left Side.' I have seen several of the li
Polypus's of the *Heart*, resembling *Worms*, and v
 rious other Things; but at that Time when *Z*
cutus wrote, this Sort of Affection was not so know
 among Physicians. That *Viper*, tho' falsely so call
 was in like Manner a *Polypus*, but in the *Kidney* whic
 was excreted with the Urine, as is vulgarly believe
 by a *Capuchin*, the History of which *Valisnerius* r
 lates and confutes, this taking the Form of a *Vip*
 chiefly from a certain tough concremented Juice. Suc
 are the other *Polypusses* of the *Kidneys* which som
 Physicians of great Reputation have reckon'd amon
Worms. *Volcardus Aita*, saith *Tulpius*, *Observ. Book*
Chap. 49. ' A Man of a full Habit of Body, bein
 ' wasted away, voided from the *Bladder*, a rou
 ' *Worm* of so red a Colour, as if it had fed o
 ' nothing but *Blood*, which growing totally flac
 ' cid, after Death, dissolved. But this *Wor*
 ' wou'd bite so sharply, as if it thirsted afte
 ' *Blood*, both the *Kidneys*, *Membranes*, *Veins*, an
 ' other Neighbouring Parts, that the Man cou'd n
 ' refrain from Tears.' This was certainly a *Rem*
Polypus form'd from inspissate or coagulated Bloo
 as many are describ'd by Practitioners; neither cou
 it bite, but obstructing the *Urethra* occasion'd int
 lerable Pain to the Patient. But *Cyprianus Maro*
 Physician to *Philip* the 4th, King of *Spain* fell into
 much grosser Error; ' A certain Sick Man voided

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a dead Worm by Stool, and died himself therewith. The Worm was 20 Fingers Breadth long, and in Thickness the Size of a strong Man's Wrist. It was full of Blood, and squeezing of it, it yielded into a Vessel more than a Pound and half of Blood.

THE Modern Physicians call them *Polypusses*, which are not only concreted Bodies adapted to the Form and Hardness of *Flesh* and *Glands*, but also such as are of a softer Consistence approaching that of tumorous or clotted Blood, as those are which are found in the *Ventricles* of the *Heart*, the *Vessels* of the *Lungs*, and other Places of the like Nature. From this kind of *Polypus* is such a Sort of *Worm* as *Cyranus Maroja* mentions; made up of Blood congealed together some how in the Intestines, and inveterated by its Continuance. Hairs are also seen to come away with *Polypus's* excreted by *Urine*, of which *Galen* and other Authors take Notice.

Worms found in the Veins and Vessels.

UPON mentioning of *Sanguineous Polypus's*, I recollected those call'd *Blood Worms*, because they are said to flow in the *Veins*. Some Physicians did believe there were such *Worms* from *Pliny's* Authority, amongst whom were *Mouffett* and *Schenkius*. 'There are Animals, saith *Pliny*, bred in the very Blood of Man, which consume the Body.' But *Harduinus* hath rightly observed in the Disease call'd *Phthiriasis* or the *Lousy Distemper*, what is proper concerning those Worms call'd *Lice*. But passing by *Pliny's* Testimony, there are not wanting Modern Authors who will affirm that they have seen *Worms* truly and properly so call'd, bred from the Blood Vessels, amongst whom is *Nicholaus Andry*, who in his

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TRACT of *Worms* saith to this Purpose, ' The *Worms*
 ' call'd Sanguineous are found in the Blood, and
 ' sometimes issuing from the Vein when cut, as
 ' *Rhodius*, *Riolan*, and *Ettmuller* witness with others
 ' and which I have seen happen twice. But a Surgeon
 ' of *Paris* nam'd *St. Martin*, attested to me
 ' That after he had cut or divided the Vein of a
 ' Patient, upon the Direction of *M. Quartier* a Physician
 ' of *Paris*, he observ'd some extraneous Blood
 ' that seem'd to oppose the Course of the Blood
 ' and moving a little the Arm of the Patient he
 ' saw an horned *Worm* rushing forcibly out with the
 ' Blood, of the Length of the *Insect* call'd an *Earth*
 ' *Wig*. And *M. Daval* a Physician likewise of *Paris*
 ' told me he had often seen several *Worms* issuing
 ' from the Vein cut; and that his Father had
 ' seen two *Worms* about a Foot long, breaking out
 ' of a Wound made upon a Vein. Also a few Days
 ' before the Death of *R. P. Senault*, Priest of the
 ' Oratory, there was a *Worm* taken from his Blood
 ' furnish'd with Wings, and like a *Dragon*. Yet
 ' would not have any one think I propose this Fact
 ' as certain from my self. For it might happen that
 ' some *Insect* falling into the Cup or Dish might occa-
 ' sion this Error, and that the Little *Dragon* was
 ' not bred in the Blood, as is believed. Credulity
 ' is commonly given to a great many the like Stories,
 ' which if nicely weigh'd, would not be so readily
 ' taken for Certainties. There are several
 ' Kinds of *Worms* to be met with in the Blood; yet
 ' those which are most frequently to be found, are
 ' near alike one to the other, and their Forms chiefly
 ' to be observed.' Thus far *Andry*: Now let us hear
 ' what *Borellus* says of these *Worms*; Thus far the thing
 ' is unheard of, and certainly stupendous, being
 ' a wonderful Argument of the Sport of Nature or Providence

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vidence, That Animals of the *Whale-Kind* shou'd swim in human *Blood* as in a *Red Sea*; and as God hath granted to little *Flies* the *Probosces* or *Trunks* of *Elephants*, so he hath not deny'd to these, *Pipes* or *Spouts* placed behind the *Head* to cast up *Blood* as *Whales* do *Water*. They resemble the *Gourd-Seed* or *Myrtle-Leaf*, and swim in the *Vessels*, being disposed like the *Fibres* or *Strings* of the *Leaves* of *Plants*. 'Tis suppos'd these *Insects*, for they want *Feet*, were created for the *Use* of the *Body* of the most perfect *Creatures*, to wit, that they might suck up the depraved or corrupted *Blood*. Therefore, if you desire to see them, take the *Livers* of *Sheep* or *Oxen*, cut them in *Pieces*, and throw them into *Water*, rubbing them with your *Hands*, and you will see many such *Animals*, which do not want *Motion* if the *Livers* are fresh. But they will remain in the large *Trunks* of the *Veins*, and I believe those *Gourd-Worms* found sometimes in the *Stomach*, often change their *Situation*. A certain *Friend* of mine affirm'd they were to be met with in all *Animals*, and that he had seen them in *Men*, *Hogs*, &c. Note, That they are not easily discovered, because they presently wither, or cling together when the *Blood* is separated from them, so that they look like a *Membrane*, or like *Blood-Suckers* sticking to the *Flesh*. Thus far *Petrus Borellus*. But I wish that what they so boldly assert, was as true as they explain it to be: But their *Vanity* is detected with little *Pains*; A certain *Friend*, saith *Borellus*, affirm'd to me, that *Insects* were to be found in all *Animals*, and that he had seen them in *Men*, *Hogs*, &c.' Therefore *Borellus* himself did not see those *Worms* in human *Blood*, but took it, that they were to be met with there from *Hear-say*: He speaks a great many *Things* with *Confidence* on this *Affair*; you wou'd swear he had not once but frequently seen these

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Whale

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Whale-like Monsters, swimming in the great Ocean with *Spouts* on their Backs, or upper Parts of the Head, gaping wide to throw out Blood after the same Manner as the real *Whales* do Water.

BOTH *Borellus* and his Friend, might have seen *Insects* plain in Sheep's *Livers*, agreeable to the Description given of resembling *Gourd-Seed*, or a *Myrtle-Leaf*, and also might easily see a certain *Foramen* or *Hole* in each End of the Body of those *Worms*, and this, no such unheard of thing, but what is known to *Butchers*, *Cooks* and *Old Women*. But it is unheard of, and likewise false, that those *Worms* which are much less found in the *Veins* of Men or the great *Trunks* of the *Veins*, should be met with in the *Veins* of *Sheep* that are out of the *Liver*; or if ever there, that they should be seen casting out of Blood, by a noted *Foramen*, as it were by a kind of *Fistula* or *Pipe*, like that of a *Whale-Spout*. What is describ'd with more Certainty concerning this Kind of *Worm*, may be read from *Redi* and *Bidloe*. Therefore I wonder that the Learned *Andry* shou'd so readily admit the Fictitious Story of the *Dragon*, as commonly believed, to leap out of the *Vein* when cut, as also the rest that related those *Blood Worms*.

BUT *Riolan*, commended by him already hath not any Thing of the Form of those kind of *Worms* lurking in the *Veins*, seen in like Manner by himself. *Zacutus Lusitanus* says, he can confirm that there are *Worms* in the *Veins*, and that violent *Wandering Pains* were abated by opening the *Vein*, and letting out the *Worm* with the *Blood*, but he does not give you the Figure of those *Worms*. *Rhodius* or *Renodæus* quoted by him, says, that the *Worm* which he saw leap out of the *Vein* with Violence was the Length of a Hand-breadth, as the *Worm* mention'd from *Daval*, by *Andry*, is said to equal Foot in Length.

AND there are other Authors who make Mentio

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of the like *Worms* found within the *Veins*; so *Spigelius* writes, that he met with a large *Worm* two Finger's Breadth long, in the descending Trunk of the *Vena Cava*, not far from the Emulgents; as also four *Teretes* in the very Trunk of the *Porta*. But it may be ask'd, whether these *Worms* were bred in the *Veins*, or whether some short Time ago they were brought thither from some other Place? But we can scarce perswade our selves, that *Worms* especially so large, could be old Inhabitants of the *Veins*, if we consider that they are carry'd along with the Blood in its Circuit, and must pass thro' the *Capillary Vessels* of the *Veins* and *Arteries*, it is hardly possible to be done. Therefore it remains, except we say that they continue within the larger Vessels in which they are bred, it remains, I say, that they proceed from without, and are lately crept into the *Veins*, wherein they are found. That *Worms* may sometimes wander from one Place to another, and frequently creep from the *Guts* to the *Stomach*, *Mouth* or *Nostrils*, we have already observed. Nay, what is more difficult and rare, we have seen from the Consequences, that they have made their Way thro' the *Membranes* of the *Guts* and the *Muscles* of the *Belly* to the *Groin* and *Navel*, and sometimes be brought from the same *Guts* within the *Bladder* itself. But after what Manner they can penetrate into the *Blood-Vessels* of living *Animals*, seems more difficult to explain. Perhaps, say some, the smallest Eggs of some *Worms* lodging in the *Guts* may enter the gaping Mouth of the *Lacteals*; and from hence be sometimes carried into the *Blood-Vessels*: It is not impossible therefore, saith another, that as the smallest *Worms*, such as are found in the *Kidneys*, and other glandulous Parts, and in the very *Flesh* of some *Animals*, can insinuate themselves among the larger *Tubules* of the biggest Vessels, so that by making a small narrow sinuous Wound, little or no Blood would

follow it. In Examples from *Spigelius* there seem to be grosser Worms, but those are not found in the Veins of Living Men, but in dead Carcasses into which, a little before or after Death, or at the Termination of the Disease they might creep by the Assistance perhaps of some *Abscess* or *Ulcer*; but and if I am not deceived, might be produced from *Worms* which from the Patient's being blooded a few Days before Death, were from thence said to be educed; so that these *Worms* rooting themselves in the *Blood-Vessels*, wherein they had been insinuated by the middle Coats thereof, after the Manner we have declared if we can believe them capable of opening a Way to themselves. So, the Reverend M. Senault mention'd, died the Second Day after Bleeding. And I have read of a certain Marquis, who two Days before his Death, when a Vein was cut, had a Worm extracted thence. See the *German Ephemerides*, Decur. 1. 2 Year. Obser. 158. The like Worms of these I never saw come from the *Veins*, but they happen'd, as I heard, of a young Man whose Family was known to me, after a *Vein* was open'd in a certain Town in *Switzerland*, and he died the same Day. Whatever hath been from these and the like Examples extant among Authors, we may infer that there are Worms sometimes taken from the Veins of Men, as well alive as dead, howsoever whensoever they come there. Altho' it may be, that the *Polypus*, of which we have treated before, has drawn unwary People sometimes into a Mistake, but I do not think this common to all Men.

BUT that is wonderful in the first Place, which is told from *Kircher* and others, of Worms met with in the Blood of sick Persons labouring under malignant and contagious Diseases. If such Worms are reality, and do not owe their Origin to Putrefaction, as nothing can be bred from thence, contrary to the Opinion of those Authors as will be demonstrated

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frated in the following Chapter ; neither can they, being extrinsically brought from *Earth, Air, Water*, or any other Place, enter into the inward Parts of an human Body, or at least live there : How can they then be suppos'd before that, to have lain in the Blood of sound or healthful Persons? But the Matter ought to be so put, that i, that the Worms or their Eggs in the Blood of the soundest Men, ought to be no otherwise contain'd there than in the other Parts of the Body, which, as I will not affirm to be so, so I will not obstinately deny, there being the same Reason for those Worms or their Eggs as others. Notwithstanding, if the Eggs of Worms possessing the *Guts, Kidneys, or Flesh of Man*, or the Eggs of Lice sticking to the Skin are form'd or bred with the Man, as we shall see hereafter, nor are yet excluded before a proper Occasion offers it self, why shall we not say the same Thing of *Blood-Worms*, and the Exclusion of those Humours, in certain Diseases which are educed from the Eggs in which they were before contained, tho' rarely happening, by a peculiar Alteration. This being laid down, we shall easily understand why in the *Plague* and other Diseases, Worms are sometimes found in the blood, and the Reason will be the same, if Credit is to be given to Authors, from the *Pestilential Ulcers* or *Abscesses*, being fill'd with innumerable Quantities of Worms ; for these Worms are brought out the Eggs being first lodged in the Blood of sound Persons, but then only excluded, since the Mass of Blood has'd that Alteration which was rais'd from some certain *Ferment* agreeable to that of the Worms. Or does this differ from that of Worms appearing in the *Pustules* of the *Small-Pox*, and also in the *Veneral Taint*, if Credit is to be given to Writers on this Subject, and also those which proceed from other *Ulcers* ; and lastly this is the Case of the *Syrones* creeping thro' various Parts of the Body ; all these

namely, by the Help of a fermenting putrid Humour are excluded with the Eggs, long temper'd in the same Humour, before it corrupted. But there are many of these Worms of the smallest Kind, which ought to be intirely different from others much larger, of which Mention is made that leapt out of the Vein when cut.

BUT if Worms of any Kind, or the Seeds of Worms are contain'd in the Blood of sound Men, we may from hence easily understand why they should be found in the *Heart* it self, in the *Brain* and all other Parts of the Body; whereas there is no Part of the Body but what is nourish'd by Blood from whence it may sometimes receive Worms, or their Eggs convey'd along thereby. But somebody ought first to shew, that all those Worms really do exist by Examples and Facts, the Truth whereof is self-evident, and also give a more accurate Description of their *Forms* than hath hitherto been done that we may be certain of the Thing, before we leave off enquiring. There is not one Reason for doubting of *Kircher's* Blood-Worms; nor are his Experiments so safe, that we can give Credit to them. There are those who deny there are any such Worms in Being, as we may see in the End of that Chapter. The Silence of *Lewvenhoeck* concerning these Worms, who was certainly much more skilful in the Management of the *Microscope* than *Kircher*, seems to be an Argument that these Kind of Worms are perhaps imaginary.

Spermatick Worms.

BUT those Worms, whatever they are, must not come in Competition with those call'd *Spermatick* not so much Worms as *Homunculi*, visible by the *Microscope* in the Seed of Men and other Animals, if we may believe *Lewvenhoeck*. And lest we are led into Mistakes, Microscopes ought to be cautiously used as several Learned Men have advised, especially

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lisnerius, in relation to these Worms. *Plutarch* mentions a *Spermatick Worm* of a different Form in these Words; (See his *Symposiacon*, Lib. 8. *Quæst.* 9. *Hospitem nostram novimus, Athenis, Ephebum, cum multo semine ejicisse Bestiolam asperam, multis pedibus celeriter ambulantem*; but that *Worm* might be added to the Seed in the Emission, as the *Beetle* we have mention'd was mix'd with the Excrements in the Stool, except we will believe all *Plutarch's* fabulous Narration.

YET there are not wanting some Moderns who will talk of this *Verminous Seed* of Man. 'An honest Woman, saith the Learned *Paullinus*, whom I knew well, the Wife of a Gentleman of Distinction in Denmark, named *Cortnummius*, as often as she received *Due Benevolence* from her Husband, felt a great Itching upon the Neck of the Womb, which was followed by a frequent making of Water. She examined the Urine which she had preserved in a Glass, and saw therein several very *white Worms* yet with red Snouts, Part swimming in the Water, and the other Part sticking to the Sides of the Glass: Another Day she took some of her Husband's Seed, and behold! they were much more numerous in that which she shew'd *Cortnummius*; but by Application of proper Medicines, which Method and Reason prescrib'd, there were vast Quantities of Worms expell'd with the Urine, and all Complaints removed. *Myssenbracchius* confirms by his own Experience, that he saw *Animalcula* of various Kinds in Human Seed, as *Vollerus* said to *Tho. Bartholine* the Younger. *Vid. Vol. 5. Act. Med. Hafniens.* Nay, the excellent *Leuwenhoek*, Fellow of the *Royal Society* in London, hath found various Worms in the Masculine Seed of various Animals. *Act. Lips. 1682.* Thus far the Learned *Paullinus*, from the Relation, as it appears of a Woman, for he does not say he heard the Husband relate it, so that there is little of Certainty to be depended on.

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Crinones, or Hair-Worms in Children, call'd by the French, Soyés, also Mascious.

FROM the Fountain of Error indicated in the Second Place, to wit, from Things inanimate are also bred a certain Species of Worms which are cutaneous, and call'd Cridones or Crinones, if they are only Hairs, as *Leuwenhoeck* will have it; of these *Ambrose Pareus* says thus, *Abscessus rarum genus in memoria revoco, in Cridones nostrates Galli nominant: Pueros præsertim dis vexat, ac quasi spinularum aculeis compungeretur dorsum, hic illuc se jactant, quietis impatientes; ab exiguis quidem, qui vix aciculæ longitudinem æquent, sed crassis spissis pilis oritur id malum.* *Paræus* calls them Crinones, not Cridones, and *Velschius* is of Opinion that this was the Printer's Fault, adding that the French call 'em Crinons, undoubtedly from the Latin Word *Crinibus*, whence comes *le Crius*, and they have a great Resemblance or Likeness to those Worms. But in the French Editions of *Paræus*, I find it written *Cridons* not *Crinons*, tho' the Reason of the Etymology, would persuade any Man to prefer the latter Name. In *Narbonne* they are call'd *les soyés*, that is Bristles, as if you should say thick and stiff; Hair like Hogs Bristles, saith *Lazarus Meyssonnerius* in his Treatise of New Diseases, Chap. 8. but Worms in the Back are call'd *Mascious*, as *Petrus Borellus* informs us, *Centur. 1. Obs. 8.*

BUT by what Name this Disease ought to be call'd does not so much concern us to know, as whether it belongs to Hairs or Worms. The Latter Opinion is defended by the Learned *Velschius*, in his Exercitation of the Capillary Worms of Infants which may be consulted, and several others, amongst whom *Ettmuller* in an Observation annex'd to his Practical Works, in which the Figure of those Worms is exhibited.

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of *Ettmuller* and others from the Number of Animals. *Ettmuller* indeed challenges us to the Test of Experience, and affirms by the Assistance of the Microscope he had seen those *Crinous*, that is, true Worms; but since *Leuwenhoeck* by using the same Instrument, did not discern them to be little Worms, but Hairs or Bundles of Hairs, and an inanimate Matter, it remains that we make a Judgment to our selves which of the two we will believe, and which not. But if we enquire whether of them understood the Art of managing the Microscope best, or used it most frequently, no Body, I am of Opinion, will prefer *Ettmuller* to *Leuwenhoeck*, who was the most eminent that Way of his Age; so that if either 'twas *Ettmuller*. But those who use these Glasses with the most Success, can decide this Controversy best; and if there are any Children afflicted with this Disease, they fall into their Hands, for I never saw any, nor any Physicians of my Acquaintance.

That Things externally adjunct to the Body of Worms sometimes are not distinguished from Worms.

THE Occasion of another Error which I recollect, and very near a-kin to a third, if it be really one, is that into which those People fall, who will not distinguish external Things, as a concreted Humour or Membrane, or any other Case or Covering contiguous to a Worm, or sticking thereto, from the Body it self, and the Parts thereof. And the History of the *Solium* and the *Tania* shew that Learned Men are very apt to fall into this Error. But if Learned Men may be thus arraign'd, what shall we say to the ignorant and unskilful who have run into this Mistake? And from these, if I am not deceived, great many Worms and other Creatures have been imposed upon us for Monsters, which upon narrow Inspection have been demonstrated to be quite

quite otherwise. So in the Neighbourhood of Geneva, within these last twenty Years, Fame spread among the Country-People, that a Calf was born with a Lyon's, or as some affirm'd, an Human Head; the Cause of which Error was soon detected by the eminent *Mianetus* and my self, before many Witnesses who were present. For the Calf was affected with a Disease call'd *Hydrocephalus*, which is a Watry Humour collected either betwixt the Skin and the *Pericranium*, or betwixt the *Cranium* and *Pericranium*, or between the *Cranium* and the Membranes of the Brain, and which it had in the Womb, so that by Reason of the Redundance of Humours, the Lineaments of the Fore-Part of the Head were very much alter'd; whence looking upon it as the Imagination inclined to this or that, the Form of it seem'd to be the same; but discharging of the said Humour by an Apperture on the *Vertex*, it was restored to its former Likeness, the Monster vanish'd, and there was nothing but a genuine Cow-Calf remaining.

Worms found in the Brain, and different Parts of the Head; and first of those in the Nostrils, or the Orbita Frontis.

To the Worms of the Intestines and Kidneys, Bladder, Flesh, Skin, and also of the Blood and Sperm, of which hitherto, may be added those which affect the Brain, and various Parts of the Head. The Disorder of the Head (as *Mouffet* says in his Book of Insects, Chap. 30.) ' was formerly frequent in Germany, ' and Hungary; and all Persons seized therewith, fell ' into a Phrenzy or Madness; upon the Death of whom ' the Brain being dissected, a small Worm was found. ' Then Physicians gave Garlick with generous Wine ' once or twice a Day, of which whoever drank were ' well, but all the rest died. *Philippus Shorus* cured ' five Servants of his which were seized with this ' Distemper, after this manner, as one writes in an ' Epistle to *Gesner*.

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Forestus in his Observation 2d Book 9. says, ' Since great Numbers died of the unknown Disease, at last the Physicians put a Stop to it, and found in the Brain of the dead Patient, a *short red Worm*, which since they cou'd not destroy with a great many Medicines which had the Power or Quality of killing Worms, at last by a Piece or Slice of *Radish* cut and boil'd in *Malaga* Wine, the Worm was destroy'd; and with this same Remedy, they cured all in the like Case, as being *Epidemical*.

' *Georgius Garnerus* in his Observations, 1547. says, that in a certain Place call'd *Ancona*, there rag'd a cruel Epidemical Disease that seiz'd Men suddenly, with a *Vertigo*, wherein the Head only suffer'd, whereby the 2d, 3d or 4th Day, from their first Illness they died. The Nature or Cause whereof all the Physicians confess'd their Ignorance. After some Time, a certain Nobleman of about 22 Years of Age, having first a Suspicion of this Illness, but afterwards being totally seized therewith, sought for Relief at home by the Assistance of various Physicians and all Sorts of *Antidotes* and *Preservatives*, but in vain; at last he went to *Venice*, and call'd in the best of Physicians, among whom was the learned St. Michel, who declared from many Reasons, that there was something alive in his Brain. For from the Loss of his Reason, Memory, and all the inward Senses, he was so afflicted for a Time, that the *Cranium* and whole Brain seem'd to be perforated as with a *Wimble*, then he perceived throughout the whole *Cerebrum*, *Extensions*, *Contractions*, and various Commotions, with great *Concussions* and frequent Tremblings in every *Paroxysm*. Many Applications external, as well as internal, were made to remove this Disease, but all in vain, for the third Day after his Arrival he died. The *Cranium* being open'd, and Garner having separated the *Dura* and *Pia Mater* from the Brain, and afterwards laying open and dis-

' disposing of the Membranes to the best Advantage from one of the Windings or Convolutions of the right Side of the Brain, appear'd the Head of a certain Worm, which being presently sensible of the Coldness of the Air, retired back again; whence it possess'd it self of both Sides of the Brain, as Galen attests; at last opening both *Ventricles* of the Brain, the right and left, which were much torn and dilated towards the Basis of the Head, *this Worm was found altogether of a red Colour, as long as the middle Finger, the Mouth sharp, oblong and black, having a Hairy Neck*, rolling it self many Ways in those Windings and Turnings of the Brain, and almost to the Basis of the Head, which being taken out with a blunt Pair of *Forceps*, and laid upon clean Paper, dried soon after.'

But first it is to be observed, that it does not follow from hence, that all the rest that labour'd under those *Epidemical Cases* at that Time, had Worms in their Heads, since from a Thousand sick, there was not one perhaps who had the Head open'd. But that this might be establish'd with some Certainty, it ought to have been perform'd upon a great many Persons in all whom if Worms were said to be found, that they might deservedly be esteem'd to be the Cause of the Disease, and the Death of those who were affected therewith. In the next Place, we may observe it is not so easy to be understood how *Radish* or *Garlick* mix'd with Wine, can destroy all Insects lurking in the Brain of those sick Persons, since those Worms that inhabit the *Guts*, if Medicines of this Nature that are taken inwardly be pour'd upon them, are not always kill'd thereby. Those Worms were certainly very lively and hard, that were found in the Brain, if we will believe the two first Histories; and which being taken therefrom, sustain'd the Force of great many Medicines without being hurt, that us'd to kill other Worms; nor did they yield to any other Medicine.

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Medicine, except Wine made Physical, with the Juices of *Garlick* and *Radish*. *Garner's* Worm was not so very as those mentioned, because when taken from the Brain, and laid upon Paper, without the Stress of Medicine, it perish'd presently. I am afraid lest *Garner* found a *Polypus* instead of a Worm, such as was form'd from concremented Blood, which us'd to be found in the Brain of those who die of Disorders in the Head, the Colour being partly red and partly black, would also in some Measure persuade one to his Belief. A certain Author, says that Worm was found rolling it self up in the *Convolution*s of the *Ventricles* of the Brain, and consequently alive; but perhaps he saw the same Worm roll'd up, not in the Act of rolling or winding it self. The Credulity of many Physicians and Naturalists who liv'd at that time, and were not so industrious and accurate at making Philosophical Experiments, gives us new Cause for Suspicion and Doubt.

THERE was a Worm in the Dissection of the Brain, which had eat thro' the *Pia* and *Dura Mater*, from whence came a *Phrenzy*, as *Paracelsus* says, but why should credit him on this Head, more than a great many others, I can see no Reason. There are many other Authors who say they have found Worms in the Brain, as *C. Gemma*, *G. Ballonius*, *Th. Bartholine*, *Wolfinkius*, *Duventus*, *Nicolaus Andry*, *Frid. Khirni*, in the *Miscellanea Curiosa*. Therefore since there are so many Witnesses, I shall not deny that Worms are sometimes found in the Brain; altho' our Faith is now and then put upon the Stretch to believe the stories deliver'd upon the Argument of *Worms*, and indeed some appear manifestly fabulous, as that told by *Hollerius*, otherwise a Learned Physician, concerning an *Italian*, who from the Smell of *Basil*, bred a Scorpion in his Brain. But if any one inquires into the Original of those Worms that inhabit in the Brain, the Matter is fully explain'd by *Schrockius* in his

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Observations on *Khernius* just cited. 'The Generation of all Worms, saith that ingenious Author is from the fecundated Feminine Egg; nor can they find here, a decay'd or putrified Place where that it can scarcely happen. For since Worms lodge in the Blood, sometimes preternaturally, may be gather'd from many Examples, of which some are to be met with in our *Ephemerides*, it remains that they as well as their Eggs may be conveyed therewith thro' the whole Body, and all into the Brain; for our venerable *Jac. Wepfer* proves that the Blood penetrates first of all into the Brain; and the curious *Malpighius* and *Vienasse* have demonstrated That, in the *Cortical Substance* thereof. From whence, if the Verminous little Eggs of the same being dilated with the Blood, this Man into the *Brain*, and is there deposited by an Obstruction of Motion in a burning *Fever*, whoever hath determined or judged that its Conception or Production was excluded in that State might not err perhaps; from which, since the membranous Coverings of the Brain are gnaw'd or eaten in Pieces, by the little Worms, that Furor or Madness hath been raised.

BUT an eminent Author observes, that those Worms found in the Brain may be most commodiously brought thither from the *Blood-Vessels*, if so be it were certain that Worms are found in these Vessels; that *small Worms*, saith he, shall lodge in the Blood sometimes preternaturally is evident from many Examples, and upon this Affair commends the *German Ephemerides*. But this Observation is consonant to what *Kircher* especially, and *Borellus* have affirm'd, which hath been hinted before, and we have shewn they are not easily to be credited.

WHATEVER hath been said, we are not to confound these with Worms in the *Nostrils*, and those said to be found in the *O. Frontis*. Certainly the Head

Gen Sheep and Goats, and Deer, are possess'd with
 Worms, which hath been long since observed by
 the Ancient Physicians; whence some conclude that
 Men are in like Manner troubled with them. *Avi-*
enna tells us, the *Indian Physicians* say, that in the Head-
 the Cause is sometimes from Worms being generated in
 parts of the Head, disturbing it thereby from their Moti-
 on; the same Author adds, and some would remove this,
 it is not necessary, that it should be taken away: For
 Worms oftentimes are bred in the Fore-Part of the Head,
 in the Place which is in the Narrowness of the Nostrils;
 and it is possible that they breed upon the Fleece, tho' it
 rarely happens. *Arculanus* also, in his Ninth Book of
Medicinis, among the Causes of the *Cephalea*, or conti-
 nued Head-Ach, gives this Solution of it, from the
 creeping out of the Worms upon that Straitness of
 the Nostrills, near the *Maxillary Caruncles*. But al-
 tho' there are a certain Kind of Worms found in the
 Nostrills of Sheep and Deer, or in the *Os Frontis*, it
 does not necessarily follow from hence, that Worms
 of the like Nature, do sometimes afflict Mankind;
 those bred from Sheep, and some Flies that lodge
 their Eggs in the Noses of those Brutes, that they
 are chang'd into Magots and at length become vo-
 lile and fly away as *Valisnerius* informs us, which
 hath never been observed to happen to Men.
 We have an eminent History of Nose-Worms from
Arnelius, *Pathol. Book 5. Chap. 7.* in a certain Soldi-
 er who had a Camoyse Nose, that is crooked upwards, two
 airy Worms like a Man's Finger, were found and bred
 from a certain stinking Filth, that lodged therein some
 time, which raged to that Degree, as to raise a Fever
 which ended with his Life, about the twentieth Day. As
 this Authority is taken from one of the greatest Men
 in Physick, so the Story must be received, as the Say-
 ing is, with your Eyes shut: But if we may be per-
 mitted to make Enquiry, we may ask this Question;
 whether this learned Man saw those Worms, or
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he described them from the relation of others? there is no Body will doubt, but that the Description is very negligent and imperfect. Two hairy Worms saith *Fernelius*, like that of a Finger. Observe the Words, for the absolute Delineation of the choice Worms; whether they were like a Finger, as to thickness and length both? If they were of the Shape of a Finger in Length and Thickness, how could they continue so long in the Nostrils, especially the straight Parts. *Riolan* answers and affirms that these Worms are bred and fed in the Hollows or Furrows of the Nose; but this Part will scarce receive such Worms. Yet *Paræus* would make this Matter plainer, in relation to these Worms, which he had never seen, least he says so, yet goes about to describe their Figures or Effigies after *Fernelius*; only he adds, that they are horned, though he freely quotes *Fernelius*'s Words, adding to them or diminishing from them, as he pleases. The Editors of *Paræus*'s Latin Works have very modestly closed a Paragraph of his, with these Words: *Horum virtutum talis erat, quantum Fernelii verbis licet intelligere, Effigies.* The Effigies of these Worms was such as you could make of from *Fernelius*: But was an understanding Painter, to draw an accurate Figure of them, from reading both *Fernelius* and *Paræus*'s Description of them, he would just make as much of one as of the other.

THESE Worms of *Fernelius* bred from Slime and Filth, were not believed by those who read what was said of the Origine of Worms; but perhaps there were those who suspected, that the Humour lodging in the Pit of the Nose, an *Ozoena* or *Fetid Ulcer*, being indurated, might be form'd in the Shape of Worms. But I shall not defend this? What then? Whether those Worms, like the *Palmer-Worm* from the Eggs of a *Butterfly*, lodged in the little Foldings of the Nostrils may be said to breed, or what other Manner of Way as we have observed in Worms lurking in the Neck of the Bladder.

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Gulielmus Fabricitius mentions almost such a sort of Worm, but less and not horned, and gives us the *Effigies*.
Cent. 1. Obs. 8. That Worm proceeded from the Nostrils of a young Man, and was thrown out by Sneezing with Pus or Snot, after a continued Pain of the Head: And the Original might be the same with the former, according to what hath been said of Worms of the Brain. Mention is also made of the Hairy Worm, by *Platerus*, that is, like a Salamander, having many Feet, which a Woman threw from her Nostrils by Sneezing, having for a long Time before felt an Itching about her Forehead which a Physician of Credit who saw it, affirm'd to be true.

BUT what Moment is it to pursue the Ancients, since the Moderns supply us much better; among these we ought not to omit the Case *Kirckringius* quotes, Obs. 43. of a certain Woman long troubled with Pains in the Head, from the blowing of whose Nose a Worm was educed of an hundred Feet, a Figure of which the Author hath given us; and not unlike this is extant, the History of a Worm coming from the Nostrils, like a Silk Worm, consisting of many Feet and the Length of half the Finger. See *Miscellanea Curiosa* 1671. Obs. 147. There is another Case of the same Nature taken from the *Royal Society* at Paris, 1708. 'A Woman who had a strong Constitution of Body of 36 Years of Age, and scarce ever had the Head-Ach before, began to feel a certain fix'd Pain in the lower Part of the Forehead on the right Side near the Nose. But the Pain which in the Beginning took up little room to that Time, by Degrees extended it self all over that Side; and since, at the Beginning it remitted sometimes for a great while, after two Years, it became continued; Convulsions and almost perpetual Wakings attended; in a Word, the Pain was so excessive, that the poor afflicted Woman seem'd twice or thrice to be in the Agony of Death, and the Paroxysms encreasing, she appear'd to be mad. But the Fourth Year being past, and she wearied out with Remedies;

and proper Diet, began to take to the Use of Snuff, leaving off all other Medicines..

After this had been practis'd for the Space of a Month only, it happen'd, that one Day in the Morning after a violent Sneezing, that she discharged a Worm from her Nose, wrapt up like a Clue of Thread, and mix'd with Blood; which when it was out, she immediately recover'd her former State of Health. The Pain tho' long and severe, suddenly abated, her Mind was entirely compos'd, but there remain'd a slight Hemorrhage for two or three Days. The Author or Editor of this Observation, Mr. Littre, a Physician and eminent Anatomist in Paris, own'd all these Facts, and shew'd them to be true in an accurate Disquisition of his.

THAT Worm was excreted alive; the Length of it, since the Body was extended, as much as it could be, was about six Inches, but it did not exceed two, when it drew it self into its various Foldings: It was the Breadth of two Straws; its Thickness one and a half wherein it was thicker in the middle Part of the Body. The Colour reddish, or of a Coffee-Die; the upper Part of the Body convex, the lower plane, with Scales on every Side, the Head excepted; it was cover'd with Rings flat or broad in a Line, all which are separated from one another by small Interstitia or Spaces, from each of which proceeds 56 Feet of the Length and Thickness of a Hair, whence our Worm appears to be of the Number of those call'd Centipedes that have a Hundred Feet. The Head was two Hair Breadth long, and in that two Eyes, and as many Horns that are easily distinguish'd, as also a Claw made up of two Grains or Forks, standing wider distant from each other towards the Root than the Top. The Mouth might also be discern'd situated between those two Branches the Tail armed with two Points or Bristles equal in Figure, Length and Thickness, surmounting the Feet. And this Worm being instantly clos'd in a Glass-Vessel, was found alive after 18 Hours? but pouring

Branch

Brandy afterwards upon it, two or three Hours Time compleated its Course of Life.

THE Seat of the fix'd Pain so long undergone by the Patient, indicated that the *Worm* lodged in that *Sinus* call'd the *Frontal Sinus*, which is a Hollow in the *Coronal Bone* under the *Eye-Brow*. But this *Sinus* is near 2 Inches long, 8 or 10 Straw-Breadths broad, sufficiently large for the *Insect*, when roll'd up, to be contain'd in.

IN the *Frontal Sinus* there is a *Foramen* or Hole tending to the *Nose*, whereby the *Sinus* it self receives Air, when we breath; so that 'tis probable an invisible Egg containing the *Principles* of our *Worms* may be sometimes attracted thither with the Air. And the same Egg may be also introduced at the Mouth with any *Viſuals* we eat, and so take a long and tedious Way of Circulation to reach the Part; but however the Thing is, thro' the *Foramen* spoken of that lies open from the *Frontal Sinus* to the *Nose*, that *Animal* must necessarily make its way out.

INDEED the *Diameter* of this *Foramen* is less than the *Diameter* of the Body of the *Animal*, but since that *Foramen* is form'd immediately of a *Membrane*, the *Worm* may by Degrees dilate that in its Passage thro'; nay, what follows from the dropping of Blood from the *Nose*, argues the Laceration of that *Membrane*.

IN this *Frontal Sinus*, there will be found Heat and Moisture for the Eggs; in a Word, whatever is necessary for the Exclusion of the *Worm*, and that *Worm*, whatever need it shall have of support; nay, that it may come to an Increase or Growth of Body which it could never otherwise have done, it might here meet with. For if it had been bred on the Ground, Food had not been so plentifully given, neither had it been so safe from innumerable various Chances which all Sorts of *Insects* are subject to, so as to have lived four Years. Besides, at every Motion of the *Insect* that *Membrane* of exquisite Sense which cloaths or covers the *Frontal Sinus*, ought to be severely vellicated and prick'd by the double Horns, the forked Bristles and 112 Feet and Nails,

' whereby that Animal digs and tears continually the lit-
 ' tle nervous Fibres of the Membrane; nay, the Pain
 ' ought to have been more violent and intollerable ac-
 ' cording as the little Creature increases in Strength and
 ' Age. But the Size thereof enlarging sensibly, whereby
 ' its Lodging Place was still straiten'd, and as its probable
 ' the Odour of the *Tobacco* seizing on this *Insect*, as it does
 ' almost all others, it was compell'd at last to come out.
 ' But if such a Case should happen to any one he might
 ' easily know from the Symptoms wherewith this poor
 ' Woman was afflicted. But such a thing happening as
 ' *Littreus* observes, the Inflammation of the Membrane is
 ' diligently to be prevented by making Use of Medicines
 ' accustomary in this Case: The Worm must be oppos'd
 ' but this, since they us'd to give Medicines inwardly
 ' which were against *Worms*, it ought to be done by o-
 ' thers externally, namely those which can penetrate the
 ' very Place possess'd by the *Worm*. *Tobacco* in the first
 ' Place, in the Case before us, teaches us to make choice
 ' of, so also acrid Juices and Acids, whose Virtues seem
 ' fit and proper for the Destruction of the *Worm*, and may
 ' be usefully snuffed up the Nose; so the same Author
 ' thinks nothing better than *Oil* and *Oily Things*, because
 ' they may fether the *Worms*, and debar them the Use of
 ' Respiration. But if all these Things are try'd to no
 ' Purpose, the aforesaid Author bids us have Recourse
 ' to Chirurgical Operations upon the *Coronal Bone* which
 ' is neither dangerous nor difficult. What Disorder
 ' may be rais'd in the Machine of a human Body, nay
 ' in the Mind it self, tho' shock'd but for a Moment
 ' and that by so inconsiderable an *Insect*!

' Thus far the *Royal Society* or *Academy of Sciences*. But
 ' one thing is to be done here, that is, to know whether the
 ' Enquiry made by Mr. *Littre* be sufficiently accurate and
 ' satisfactory? I verily believe there was nothing omitted
 ' that was thought necessary and useful to induce us to
 ' Belief of the Truth of this; nor perhaps was it impossi-
 ' ble, that this *hundred-footed Worm* might creep into the

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Woman's Ears being asleep, or laid upon the Ground. The only Difficulty remaining, and that not so easy to be got over, is the Length of Time this *Centipede* staid in that Bone; nor can any one readily understand how that *Worm* could live there 4 Years; whereas the *Worms* that are found in the Forheads of *Deer*, do not inhabit their Tenements near so long, or whether that *Worm* was of the kind of those which they say lodge in the *Veins*, from whence either it self, or the Egg from which it is bred, may be convey'd with the *Blood* to the Vessels that lead to the *Frontal Sinus*, and consequently devolve upon the *Sinus* it self? As this would be the most commodious Way, allowing these *Insects* sometimes to be contain'd in the *Veins* or *Arteries*, since there is no Part of the Body but what is water'd with *Sanguineous Rivulets*, no where but where these *Insects* might be met with or their Eggs dispers'd. But as we have already observed, the Existence of those *Blood Worms* ought first to be demonstrated.

THERE are also *Nose-Worms*, and those not all of one kind; so *Monardus* cured one labouring under a *Polypus* of the *Nose*, by injecting Juice of *Tobacco*, by which the *Ulcer* being well cleans'd he discharg'd many *Worms*. Nor are *Worms* frequently proceeding from the *Nostrils*, properly call'd *Rhinarii* or *Nose-Worms* to be reckon'd with the kind of the *Teretes*, which ascend from the *Intestines* and *Stomach*, because some are not different from the ordinary *Round Worms* of the *Guts*. With these, in my Opinion is added that white Worm, round like the *Worms* of the *Guts*, almost half an Ell long, creeping out gradually from the *Foramen* of the *Nostrils*; of which the *Miscellanea Curiosa* makes Mention, this *Worm* lurks under the *Cranium*, and hath been the Cause of a continual *Head-Ach*; but it is not sufficient to say this, without Proof or Demonstration: We will joyn to this another *Worm* longer than the Palm of the Hand, which *Benivenius*, an Author who writes of the hidden Causes of Diseases, declares was forced from the *Right Nostrils* of a certain Friend of his who labour'd under the most cruel and outrageous *Head-ach*. But

that may be true which is written by a learned Man, to the Place from whence that *Worm* came; but if he had believed that *Worm* descended from the Brain, he was at that time deceived, and any Author might easily fall into the like Error about the eruption of *Worms* from some other Parts, being less diligent and careful to examine some Places.

From whence Worms come at first, not considering from what Part they are produced.

Amatus Lusitanus tells us, that a *Worm* may be sometimes educed or drawn from the great Angle or Corner of the Eye, and gives us the Story which may be seen (*Cen. 7. Cur. 63.*) But this *Worm* ascending from the *Intestine* thro' the *Stomach*, *Mouth* and *Nostrils*, by Accident find out the *Nasal Duct* or Passage, and by the *Lachrymal Points* creeps at last to the Corner of the Eye. This being laid down, if any one reckons that among *Ocular Worms* that breed in the neighbouring Parts, he will find himself deceived, and *Tho. Bartholine* gives us another Example of an Error or Mistake. For since *Worms* may sometime lie hid in the *Tonsilla* or *Almond Glands* as well as in other *Glands*, as appears from Examples already mention'd, which some perhaps may fancy proceeded from those *Glands*, and from thence the Author affirm'd that the *Worms* were more easily excreted with the *Pus*. He observed also, that a Vomiting happened, but accidentally or casually, as if that Vomiting came as an Assistant to the Excretion of the *Worms* drive them from the *Jaws* with the purulent Matter. But if we consider the thing properly, we may easily see the *Worms* issuing not from the *Tonsilla*, opened by the Incision Knife, but from the *Stomach*; neither had the *Worms* Occasion or Need of the *Vomit* to be expell'd from the *Tonsilla* as *Bartholine* seems to believe, but the cutting of the *Abscess*, and the flowing from thence of the *Pus*, and the Subversion of the *Stomach* was the Cause of that *Vomit*. And the Thing will appear still clearer, if we consider the Size of the *Worm* voided, to wit, the Length and

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Thickness of it, which was not reasonable to suppose would be contain'd within the Compass of the *Tonsilla*. Our Author continues to say, *several other Worms follow'd, but they were less*; he seems to hint these less Worms that came last, were of the kind of the *Teretes* that are wont to lodge in the *Guts* and *Stomach*; for if they had been like others, which us'd to live in the *Glandulous Parts*, as formerly observed, they would not have been said to have been only less than that great one first excreted, but they would have been call'd much smaller and minuter.

To this Example, I must add a third, worthy of Notice, taken from a late Observation of *Thomas Alghisius* a learned Physician and *Lithotomist*; 'I visited, says he, a Boy of 7 Years old, born of poor Parents, then sick at *Florence*, who began about a Year before to piss Worms, and he had voided of those about 16, the same Way: The largest of them was of the Thickness of a Writing Quill, and the Length various; but one among the rest was as long as half a *Florence-Ell*; others were smaller and of the *Ascarides* kind: Beside these, the same Boy discharg'd backwards a great number of Insects. Some believ'd that those Worms issu'd from the the *Penis* or *Yard* were in the *Kidney* or *Bladder*, and from thence fell thro' the *Urethra*. But I have observed that all these Worms bear the same Form, whether they are excreted from the *Anus* or *Penis*, but with this Distinction, that those which proceed from the *Yard* are smoother than the others. Hence I recollected that if I nicely inspected the *Intestinum rectum*, I might discover whether there was a Passage from thence into the *Bladder* or Neck thereof, or contrarywise from this to that, which being done, I plainly saw the Matter so, and by the Help of a Probe, I found a *Fistulous Sinus* leading from the *Gut* to the *Bladder*, from which I observ'd the Urine run; so that from that open Passage I was certain those Worms were not generated or bred in the *Kidneys* or *Bladder*: Hence I ask'd the Parents, whether the Child had ever been troubled with a Tumour, or

any other Disorder of the *Anus*, they answer'd that he had had the Worst kind of *Small Pox*, about 14 or 15 Months ago, and from that Time began to discharge these Sort of Worms; whence I understood that there was an *Ascess* made in the *Intestinum rectum* during the Continuance of the *Small-Pox*, which being neglected or not cured, by the continual Corrosion of affluent Matter, a *Sinus* was made by Degrees, which penetrating to the very Bladder, degenerated into a *Fistulous Ulcer*.

BUT young Students may learn from these Examples to distinguish partly from whence Worms break out or may be said to break out, from the Part in which they are bred, or was the proper Situation they were us'd to, from which otherwise they make their Way; and this is a fourth Error which may be added to the three foregoing, the first of which is employ'd about these *Insects* which are without, and pass from the human Body, because they are falsely believed to be found mix'd with the Excrement; the second and third describe the Form of Things inanimate as well as Worms, or which adhering to Worms are falsely believed to be Parts of the Body of those Worms.

BUT let us return from whence we digress'd, and briefly examine, whether beside what are mention'd, there are any other *Worms* really troublesome to the *Human Nose*. *Petrus Borellus* writes, that the Fact is so, and assigns *Worms*, but does not describe their Form, that inhabit in the outward Parts of the Nose, but affirms they are call'd *Nascolas*; but what hath been already said on this Head, when we were treating of the *Crinones* may suffice here.

Worms of the Eyes.

WE have spoke of the Worm proceeding from the great Angle of the Eye, and creeping thence from some other Place. Now it may be ask'd, whether Worms are ever drawn out from those Eyes? *Pechlinus* affirms them really to be taken out thence; speaking of the Eyes, he says, Nor do I know whether it hath been observed that the Inflammation of them is owing to minute insensible li-

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The History of Worms. 297

the Worms. A Girl of 8 Years old was committed to my Care, which had suffer'd under this Distemper 5 Years, the *Eye-lids* were always red, and afflicted with a most troublesome Itching, so that they required scratching intolerably, but that was no secure Relief when the *Serum* grew too hot, and fell upon the Eye from the Friction or rubbing of the Hand: Neither was this Itching allay'd by hot or cold Means, but both were us'd in vain; for a Liquor made of the *White of an Egg* and *Vitriol*, or *Sugar of Lead*, or *Honey*, or *Sugar Candy*, nothing prevail'd, but the Mother wearied out with what had been directed by Physicians, apply'd her self to an Old Woman, who advis'd her to boil an Egg hard, and cutting it in the middle to take out the Yolk, and apply the Hollow Part of the White of the Egg while hot to the Convexity of the Eye. This she did, and without Delay, nay immediately the *Itching* ceased, and from the Burning Heat and Fume of the Egg, the little *Animalcula* were call'd out and cover'd the White of the Egg, like a Swarm of the smallest *Nits*. But since those slender little *Corpuscles* were scarce distinguishable by the naked Eye, they were brought to a better Light, and the Lineaments how confused soever before, made plainly appear by the Microscope. And when they were put to the Flame of the Candle, they crackled, which I doubt not proceeded from the breaking of their *Saline nitrous Corpuscles*. Thus far our Author. But these rather seem to be the Eggs of *Worms* than *Worms* themselves: Now if they had been either Eggs or *Worms*, but not *nitrous saline Bodies*, as the Author indicates, but destitute of Life, the Eyes had been pierced thereby: Yet, I will not affirm this: There is another Story taken from the *Miscellanea curiosa*. 1971. Ob-
serv. 78.

Worms of the Teeth.

WORMS are also said to inhabit in the Hollows of the Teeth. 'A certain Person saith *Oligerus Jacobaeus* in the Philosophical Transactions of *Copenhagen*, being troubled

'troubled with a vexatious Periodical *Tooth-Ach*, feeling something beating or leaping in the *Tooth*, at certain Times, to which many Remedies were apply'd in vain at last sawing or filing off the *Caries* Part of the *Tooth* out dropt a Worm as it were from a Bag, which turning it self from the Head to the Tail, repeated several Jumps, from a large *Foramen* thro' which it issued out and which was plain to be seen in the *Tooth*. Dr. Ty and others commend Smoaking of *Henbane* in this Case and the Application of *Deer-sue* to the *Gums*. There are many Stories of *Worms* of the *Teeth* extant, but particularly that in the *Miscellany of the curious* is most observable.

'It is remarkable at this Day, saith the ingenious *Pechlinus* by several Authors, that the *Teeth* are troubled with *Worms*, and yet there is not one to be met with among them all, that hath given us an accurate Description of them, or a Figure drawn from the Life. I shall do a valuable Thing therefore in my Opinion if I can set this Matter in a true Light.

'I cured about 7 Years ago an old Woman of *Lyon* afflicted with a cruel, infectious and corroding *Scurvy*. Among other *Symptoms* she happen'd, beyond Expectation, to fall into a deplorable *Tooth-Ach* that would yield to the best of Medicines. And as this Pain the *Teeth* often proves a Reproach to Men of Art, it is rather cured by some superstitious or ridiculous Means the most unlikely to succeed, so here it happened. Therefore the Woman, whether thro' Excess of Pain or the Case compelling, took some *Honey*, which perhaps was the next Thing at hand, and without reflecting any further upon the Matter, apply'd it to the rotten Hollows of her *Teeth*: But alas! where Medicines were thus rashly and unadvisedly taken, she expected Punishment and an Increase of her Pain, but quite contrary fell out, for scarce a Moment of Hour pass'd, when the Pain was abated, and she an intollerable Itching at the Top of her Tongue, which

she believed to proceed from a *salt acrid Flux*, and feeling the Medicine with her Finger, she found the Worms tumbling on all Sides her Mouth to the Number of five, mark'd in the Front with a livid Spot, and if we regard the whole Shape of 'em, not unlike a common Louse. She order'd me to be sent for, being the lucky Conqueror of such slender Monsters; but I had scarce enter'd the House, when she full of Joy, and free from all Pain, told me of this wonderful Gambol or sporting of Nature, and the rare Success of her despised Medicine. But when I had view'd them with the naked Eye, and afterwards with the Glass, I observed those Worms not ill shaped, at least much better proportion'd than those which daily Experience shews in the *Liver of Sheep*, and the common Butchers in *Italy* call *Biscioli*, we in *England*, *Flewcks*, which the curious *Redi* hath depicted in his *Book of Insects*. But how do those Worms bred, in the *Egg*, *Seed*, or *Corruption*? that roundish Figure the Body cleaves to, which we call an *Egg*, we cannot credit at all; and the Fragments of remaining Food in any thing *seminal* or *ovarious*, before being animated to be at last extended into a plain absolute animal, is likewise less probable. Some may suppose perhaps, from a *Scorbutick Tartar*, by Accession of a *Spirit*, *Aerous* or *Idea*, that these lively pufft up Vesicles of Worms with Snouts and Feet came. But now as 'tis evident that these living moving Creatures had a Being, how did they create such Pain; whether by sucking or drawing like the *Leech*, for the Patient own'd that she felt a kind of traction? or whether by biting or vellicating the *nervous Fibrils* which hang to the Roof of the rotten Cavity? or lastly, by creeping about the little Membranes the Teeth by a slow Motion, such as that seems to be of Worms that lie undiscover'd in the Face, yet plague us with a troublesome Itching?

THERE is another Observation of the learned *Schultzius* concerning *Worms of the Teeth*; 'Whereas, says he, there is scarce any Part of a human Body, how noble soever

' it

it is, but what is sometimes, as the Writers of Physic
 observe, infested with, or liable to *Worms*; so neither
 are the *Teeth* free from them, because they are often
 rotten and hollow, and so consequently there is a proper
 Situation to lodge and breed in; such as *Pechlinus* hath
 observed, and he and his curious Colleague hath shewn us
 and is already mention'd from *Obs.* xxiv. But the Cause
 of the acutest Pains is still owing to these *Worms*, so
 that the Practitioners of Physick have been deservedly
 solicitous to kill and destroy them, and *Sennertus* pre-
 ferable to the rest, recommends many, of which I think
 this ought to be remark'd; *Take the Mucous or Remain-
 der of the Chyle sticking to the inward Tunicle of the Stomach
 of an Hog.* Altho' it seems to be a sordid foul Medicine
 and may give Distaste to the more delicate Sort of Per-
 sons, yet it comes well recommended from Experience.
 A Woman belonging to my Family, was tormented
 with sharp cutting Pains, of one of the *Maxillary Teeth*
 which tho' stupified with Medicines, grew worse again
 afterwards: At last being perswaded by another Wo-
 man, as is customary among those Sort of People, who
 are very ready to give Advice, she fill'd her aching Tooth
 with Leaves of *Rosa Solis*: But alas the Pain increased
 insupportably, so that she was almost at the Point of
 Distraction; when it happen'd out luckily, that she
 heard there was a Hog to be bowell'd in the Neigh-
 bourhood; therefore some of the Neighbours remem-
 ber'd this Remedy, in the like Case, and went to the
 Butcher, asking for some *Mucous* that stuck to the *Pylorus*
 which was yet warm, in this they dipt some Lint, and
 apply'd it to the aching Tooth. After a short Time she
 perceived a tickling upon the Gum, took away the
 Pledget from her Mouth, and found several *Worms*
 sticking to the *Suet*, and several others which she spul-
 out with the *Viscid Flegm*, after the Pain was abated.
 She shew'd me these *Worms* wash'd in Water, which
 winding and turning themselves this Way, and that
Worms usually do, lived sometime so; they were almost

all of them as long as the Breadth of a Man's Thumb, scarcely exceeding the Thickness of a fine Thread; while alive they were of a Flesh-Colour, but dead and dry more inclinable to a tawny yellow. Seen by a *Microscope*, they were extreamly like *Worms of the Guts*, each of them ending in a sharp Snout; the Body was pellucid, join'd together with abundance of Rings, reddish in the inward Parts, which are transparent thro' the Skin.

THUS far *Schultzius*. But *Andry of the Generation of Worms*, deny'd that there are any such Worms brought from the hollow *Teeth*, and that are the Cause of such violent pains, substituting other Worms in their stead, which lie conceal'd, outwardly sticking to the Foulness of the *Tooth*, and create a Stench, no Pain, at least not what is great to the *Teeth*, altho' they gradually corrode and eat them away. He describes these Worms thus; 'Worms generated in the *Teeth* are wont to be found under the Crust or Scale in foul *Teeth*; those Worms are very small, having a round Head with a remarkable black Speck or Spot, the rest of the Body is long and small, such as we observe in Worms floating in Vinegar. I saw those by the help of a *Microscope* in the Scales off from the *Teeth* of a certain *Matron*, and there are scarce any *Scales* taken from the *Teeth* free of these Worms.' But those Worms do not exclude others, except he had shewn at the same Time something false that is deliver'd by those celebrated Authors noted, of those first Worms that lodge in the hollow *Teeth*. *Leuwenhoeck* hath still more to say concerning Worms in the *Teeth*; 'Before I saith he, I write my Observations about the *Saliva* or *Spittle* in the *Philosophical Transactions of the Royal Society* at London, 1678. After I had made several Observations about my *Saliva*, with this Intention, that if any *Animalcula* were dispers'd thro' that Body by Chance, they might be discern'd to be brought into the Mouth at one Time or another, by means of the Vessels which elaborate or make the *Rheum*; but altho' I had observed it as curiously as I could, yet I could not

' not detect any *Animalcula*; nor can I say any thing else
 ' than what I saw before. But I used in the Morning to rub
 ' my Teeth with Salt, and afterwards wash my Mouth
 ' with Water; and when I had eat, to cleanse my Grinders
 ' with a *Tooth-scraper*, whereby my Teeth were so clean
 ' and white, that few in my Time ever saw any like them;
 ' nor did my Gums, tho' I rubb'd 'em with hard Salt, ever
 ' bleed. Yet notwithstanding my Teeth were so clean, by
 ' means of the Glass, I perceiv'd something growing be-
 ' mong the Teeth of a whitish Substance, that seem'd like the
 ' best Flower finely ground. This when I saw, I suppos'd
 ' tho' I cou'd not discover any Motion in it to contain
 ' living *Animalcula* therein. Therefore I often mix'd the Matter
 ' to pure Rain Water, in which were no *Animalcula*, and
 ' also to the *Saliva*, which I took from my Mouth after I
 ' had separated the little Bubbles of Air from it, lest they
 ' should excite a Motion in the *Saliva*; and I saw with
 ' great Admiration every where, many little *Animalculae*
 ' that were in the said Matter moving themselves, and
 ' sporting after a pleasant Manner.

' I also took *Saliva* from the Mouth of two Women
 ' which used daily to wash their Mouths, but this I could
 ' serv'd as nicely as I could; afterwards I mix'd the Matter
 ' with Water, which with an Instrument I got from their Teeth,
 ' then discover'd in that many living *Animalcula* together
 ' with oblong Parts of which before. I likewise observ'd
 ' the *Saliva* of a Boy about 8 Years old, and could not
 ' detect any living *Animalcula* therein; afterwards I mix'd
 ' to that the Matter taken by my self from the Boy's Teeth,
 ' and then there was just such Plenty of *Animalcula* and
 ' other Particles as I have mention'd before. Hence I did
 ' not wash my own Mouth on purpose, for 3 Days, and
 ' took the Matter which adher'd in small Quantity to my
 ' Teeth and Gums, and I mix'd that equally to *Saliva* and
 ' pure Rain Water, and found therein some few living
 ' *Animalcula*.

' TALKING with an old Man who lived soberly, never
 ' used hot Wine or Tobacco, and rarely drank Wine at all

I cast my Eyes upon his *Teeth*, which were then foul; seeing this, I ask'd him how long it was since he cleansed his Mouth last? To which he answer'd, that he never did to do it; then I took the *Saliva* from his Mouth, and examin'd it, but found nothing else in it, but what was in my own and that of others. I also took the Matter which lodg'd and stuck betwixt his *Teeth*, and mixing that with pure Water, wherein were no *Animalcula*, and likewise *Saliva*, I found an incredible Quantity of *Animalcula* that were much quicker in swimming, than I had seen before of the largest kind, of which the greatest number was bending or waving their Bodies in their Progress. Beside, there were other *Animalcula* in such vast Numbers that the whole Water seem'd to be alive, tho' there was so little Matter taken from the *Teeth*. The Oblong Particles aforesaid were also here in great Plenty. I took the *Saliva* and white Matter from the Mouth and *Teeth* of a certain old Man, who us'd to drink burnt Wine in a Morning, and Afternoon to drink Wine and smoke Tobacco, that I might see whether by this continued Course of drinking and smoaking, the *Animalcula* could be preserv'd alive. I thought this old Man, because his *Teeth* were intollerably foul, never wash'd his Mouth; therefore I ask'd him the Question; but he answer'd indeed, that he never did it in Water, but daily by pouring down of Wine both hot and cold; nor could I find out any thing in his *Saliva* different from that of other People: I then mix'd *Saliva* to the Matter which had stuck to the fore-part of the *Teeth*; nor did I find any thing therein beside some few of the *Smallest kind* of these living *Animalcula* so often spoken of, but in the Matter which was among the *Teeth*, I found many more that were compos'd of two Sorts of the least kind.

FURTHERMORE, I pour'd the sharpest *Vinegar* into my Mouth, and shutting my *Teeth* close, I forc'd the *Vinegar* to pass thro' the Intervals thereof two or three times; this being done, I wash'd my Mouth three times with fair Water, and afterwards I took this Matter from the

Teeth

‘*Teeth* of both kinds and mix’d that variously as well with
 ‘*Saliva* as *Rain Water*, and discover’d every where an
 ‘credible Number of *Animalcula*, but chiefly in the *Matter*
 ‘ter I took from the *Grinders*, but few were alike. I al
 ‘added a little *Vinegar* mix’d with the *Saliva* and *Water*
 ‘whence the *Animalcula* presently died. Hence I conce
 ‘ded that the *Vinegar* I had in my Mouth did not per
 ‘trate thro’ all the Matter, which was too closely bound
 ‘in among the *Teeth*, and therefore it only kill’d those
 ‘which were in the outward Part of the *white Matter*.

‘IN some of the foresaid Observations there appear’d
 ‘me twice or thrice, certain pellucid Particles, some where
 ‘were perfectly round, others were imperfect; the Size
 ‘these were various: I judg’d the largest of them to
 ‘about 25 times as big as a *Globule* of our Blood, and ha
 ‘they not descended by reason of their Gravity toward
 ‘the Bottom, I had taken them for Particles of Fat.

‘There were several Matrons at my House desirous
 ‘seeing the little *Eels* in *Vinegar*, some whereof loath’d it
 ‘that they said, they should certainly never use *Vinegar* again
 ‘What wou’d they do or say to see the Number of Worms
 ‘in their own Mouths, that there may be said to be more
 ‘*Animalcula* in the Mouth of one Man, than Subjects
 ‘a whole Kingdom, especially in the Mouth of those who
 ‘never wash them, whence proceeds such an intollerable
 ‘Stench from some Mens Mouths, that it is troublesome
 ‘to talk with them, which many call a *stinking Breath*, wh
 ‘indeed that arises from a putrid or decay’d Bone. As
 ‘my self ’tis my Opinion, that tho’ I wash my Mouth eve
 ‘Day, there are not so many living in the *Seven united Parts*
 ‘*vinces*, as I carry living *Animalcula* in my Mouth;
 ‘looking formerly upon one of my hinder *Grinders*, the
 ‘stuck or adher’d something of about the Thickness of a
 ‘Horse-hair of the afore said Matter, which Part as I sup
 ‘pose, I had not rubb’d with *Salt* for some Days, I took
 ‘the Matter away from thence, and beheld in it such a
 ‘number of *Animalcula*, that there seem’d to be contain’d
 ‘a thousand in no larger Space than the hundredth Part
 ‘of a Grain of Sand.

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WORMS of the Teeth, call'd Syrones.

THUS far *Leurwenhoeck* hath describ'd the little Worms of the Teeth different from what *Pechlinus* and *Schultzius* relate; for these, indeed, are much less than those, and also less than these Syrones; because they can only be discern'd by the best Microscopes, whereas these can be easily seen by the naked Eye. There are Worms, saith *Mouffetus*, *Insect. Theatr. Book II. Chap. 24.* which are call'd Syrones, bred in the Teeth, which they affirm, upon the smoaking of *Henbane-Seed*, will fall into little Pieces or Fragments of Threads or Strings; tho' I deny that those Fragments are Worms. These Syrones are bred in rotten Teeth, and most known to *Tooth-Drawers* and *Barbers*: But *Scribonius Largus* doubts whether these Syrones or Worms are educed from the Teeth by the Fumigation of *Henbane*. There are more modern Writers, who speak upon the Subject, but this is sufficient, in relation to Worms of the Teeth.

WORMS of the Ears.

THAT Worms have been sometimes found in the Ears, hath been observed by the *Ancients* themselves, who have prescribed Remedies in those Cases: But these seem to have fallen out in purulent or ulcerous Ears; nor perhaps to be distinguish'd from the Worms of the Ulcers, as hath been hinted. Of this kind hath been those which *Kerkringius* hath describ'd in his Anatomical Observations. 'Look upon this Animal diligently, saith he; many such were produced in the Year 1663 from the Ear of a certain Man; first of all the Ear was inflam'd with the greatest Pain, then it suppurated or digested, afterwards the mischievous Imposthume being open-

ed, it discharg'd a thick, discolour'd, stinking Matter, and at last these *Guests* which *Kirkringius* describes, came out of their Hold; but whether they, or the acrid Matter corroded the *Tympanum* or Drum of the Ear, I know not; but this I know that they left their Host a Token of Remembrance which was Deafness. Thus he represents the *Worms*, not much unlike those of *Asellius*. The Form or Figure of those *Worms* which *Valesens* *Taranta* speaks of are different. 'I see, saith he two or three *Worms* driven from the Ear of a young Man having an *acute Fever*, which were of the Figure of Pine-Seeds, but yet larger, and the Matter was cur'd.' Those *Worms* were also very like those which *Schenckius* mentions to be taken from a *Taylor's* Ear, after he had borne a Noise in his Ears, and continu'd Pain in his Head, by means of a certain Liqueur made of *Aethiopian Cummin-seed* infus'd in hot Water, and put into the Ear. These *Worms* were like those which are found in old Cheese. This bears some Analogy to a former Observation of the same Author, of a Countryman, from whose Ear a *Worm* was drawn, not less than the little Finger, and the most cruel Pains of the Head, by smothering or scenting the Ear with *Myrrh* and *Prunes*.

PERHAPS, some believe, that the *Worms* which are found in the Ears after grievous *Headachs*, are bred, or have made their Way thither, through the Indisposition; and the Authors of some of the Observations laid down, seem to have credited this, tho' there is no Way open from the Brain to the Ears, but by the *Blood, Vessels*, or the *Nerves*. Since the *Nerves* are not so open, that *Worms* creep through 'em into the Ear, there is no Passage for 'em consequently, unless they can be receiv'd into the sanguineous Ducts. But first it is to be demonstrated, that *Worms* of this Kind can support the

elves in these Vessels, of which we have said something before. Therefore we must suppose, that they can conveniently admit themselves from without and enter the Ear, or else that these *Worms* are bred from the Eggs of *Flies* deposited in their Cavities. Nor are there wanting Examples of *Worms* which are said to creep into the Ears from without. *Volckamerus*, in the *German Ephemerides*, tells us of a Girl of Eighteen Years of Age, who, while she was laid asleep in a Meadow, had a round *Worm* of the common Thickness of an Earth-worm, and the Length of the middle Ring-Finger, enter'd her Right Ear, and by degrees eating its Way, and pushing forwards, it ascended to the *Forehead*, and there lodg'd a Month, producing many Plagues to the Wench. At length Oil of *Juniper* was put in, which being done frequently, two smaller white *Worms* were ejected; because they were the *Issue* or *Product* of the said *Parent*; after the last Infusion of that Oil, the Father himself, a *Worm* of a reddish Colour, being in great Distress, and half dead, came forth, but left behind an intolerable Pain about the *Forehead*, which was reliev'd by a Fumigation of *Gum-Ammoniac*, together with a Flux of *fætid Sanies* or *stinking Pus* and Corruption. In this Month of *August*, saith the same Author, a poor Woman, for the Benefit of my Advice, consulted me about her Daughter, who had a *Worm* in her Ear almost Three Years, which was alive about Three Days before, and was of the Form and Size of a common *Chestnut*, and which crept out by the Means and Benefit of warm Bread; the Girl was then merry, not considering what Damage might remain. Now whether this *Insect* made its way into the Body, or was bred there, is left in doubt. Thus far our Author, whose first Observation some things occur too difficult to be believ'd.

WORMS found in the Heart, Lungs, Liver, and Spleen.

AUTHORS make mention of *Worms* found in the *Heart, Lungs, Liver, and Spleen*; but, perhaps they are not all true which are said of them; since the *Polypus*, as hath been observ'd, may often induce Persons that are not sufficiently cautious, to make Mistakes; so, if *Worms* are bred in the Brain, we cannot deny but they may be found in the *Viscera* but not for that very Reason. *Zacutus Lusitanus* speaks of a *Worm* in the *Heart*; and we have shew'd the Reality of a *Polypus*. The *Worm* describ'd by *Schenckius* is not of the same Nature; it was white with a sharp *Snout, or Beak*, and that horny Matter adhering to the *Heart* of a certain Prince. It is said to be taken alive; nor was it kill'd but with the Savour of *Garlick*. The same Author mentions another *Worm*, found in the *Capsula* of the *Heart* of a Man seiz'd suddenly with Death. *Fr. Paulinus, O. servat. 13. German. Ephemerides*; 'Some believe, said he, that the *Heart*, or the first thing living, and the last dead, hath certain *Privileges* and *Exemptions* beyond the rest of the *Viscera*; but it undergoes the same Fate with all the other Parts. *David Horstius*, in his *Guide to Physick*, tells us of a winged *Worm* found in the *Heart* of a Boy. *Servat. 13. German. Ephemerides*, of a forked or double Snake with Claws in the Left *Sinus* of the *Heart*. We had an Account from *Paris, 1676*, of a *Serpent* that crept from the *Heart* of a certain Prince of *France*; and besides these there were many other *Worms* found in the *Viscera*. *David Kellner* saw Six very white *Worms* in the Left *Ventricle* of a *Stork*, of the size of a *Pin* in Length and Thickness. A Countryman found in his *Sow* very fat, when she began to complain

some inward Grief by her sorrowful grunting and unusual rowling of her Body about ; in the mean time, no body could guess, what had happen'd to the Beast ; at length, she began sensibly to fall away, obstinately refusing her Food : Therefore she was kill'd ; but see, when the Knife reach'd the *Heart*, behold an entire *Nest* therein, full of flying *Vermin*, which had almost devour'd all her Substance ; every one of which had *Six Feet*, all of 'em nicely distinguish'd by three Joints, long, and also high ; at the End and the Beginning black, but in the Middle, in some measure, red ; the Wings of an *Asb-Colour* ; in the place or stead of the Tail, they drew after them a long Sting, armed with a sharp *Proboscis* or *Snout*. A *Butcher* at *Gluckstade*, in the Year 1674. shew'd me an *Ox's Heart* fresh extracted, to which two *horned Beetles* firmly stuck ; and about the *Heart* of a *Duck* I myself took a small *Serpent* making his Turnings and Windings after a wonderful manner. In the *Heart* of a *Hen* a black *Palmer-Worm* of an unpleasant Smell. And lastly, in the *Heart* of a *Magpye* four *Maggots* or *carnivorous Worms*.

Do you believe all these things, friendly Reader ? For my part, I shall not persuade you beyond your Reason. I own, indeed, that there may be *Worms* found in the *Heart*, and also in the *Brain*, but not sting'd ones. And likewise a forked Snake or a *Serpent* in the *Prince's Heart* may be met with ; but think these ought to be reckon'd among the *Poisonous Kind*, and not that of *Worms*.

AUTHORS have told us of *Worms* found in the *Pericardium* ; so *Baglivy* communicates his Observation to Mr. *Andry* of the *Generation of Worms*, 1714. of a black, hairy Worm, the Length of a Palm, found in the *Pericardium* of a certain Person : This Man, after cruel Pains of the Stomach, and Parts

adjacent, for some time suffer'd convulsive Motions, with Paleness of the Face, and Loss of Strength throughout the Body, eight times an Hour.

ALSARAVIUS writes, that *Worms* have been discharg'd from the *Lungs*, and that a *Cough* is sometimes procured from these *Animalcula* breeding in the Pipes of the *Lungs* and Cavity of the Breast, which, tho' they are scarce so big as the smallest Flies, yet when they shift from Place to Place, the *Cough* arises, and ceases when they are at rest. *Abynzoar Abhomeron*, that the ancient Physicians saw and writ of this. ' By a *Cough*, saith *Platerus*, *Worms* are sometimes ejected in consumptive Cases. And ' I, says *Lauzoin*, in the Year 1699. in a *Peripneumonia* Patient, saw a red *Vorm* excreted by coughing, that was not small, after the voiding of which a great Quantity of purulent Blood followed, and then Death.

SCHENKIUS relates an Observation of *Caspar Bauhinus*, of *Worms* found in the *Liver* of a Boy who, labouring under the *Measles*, died of them. ' Most of these, saith *Bauhinus*, are found in the very Branches of the *Vena Porta*, and sometime in those of the *Liver*, some of which are living others dead; these are red, and, according to the Place in which they are contain'd, oblong, sufficiently large, but soft to the Touch; also gibbous as to the Superficies, by reason of the Concavity of the Body in which they are bred. Add to this *Æmilins Campolongus*, Professor of *Padua*, with many others. See what *Bidloo* says, Chap. 6. where he speaks of *Worms* found not only in the *Liver* of *Brutes*, but also of Men.

NOR is the *Spleen* free from *Worms*, as *Albertus* and *Gentilis* witness; but the latest of all *Andry*, who mentions, of his own Knowledge, three long small *Worms*, in Figure like those which are bred in the

Guts, which he found in a Man's Spleen, who was of a melancholy Disposition, and took from the middle thereof: These liv'd in Water near Four Days.

WORMS, like *Ascarides*, are said to breed in the secret Parts of a Woman; and *Hippocrates* first taught this Doctrine, in his Book of the *Diseases of Women*; to the modern Physicians have observ'd the same. A certain old Woman, says *Beckers* in the *Miscellanea Curiosa*, being lascivious at Seventy Years, labour'd under an intolerable Itching of the Neck of the Womb; first having us'd Evacuation, uterine Clysters were apply'd of Milk and *Southernwood*, and then *Wormwood* and *Tansy*; by which Means she was cur'd of her *Itching*, and discharg'd a Multitude of *Ascarides* from the Womb, a large part of which was living. Nor were there wanting of those who had in the *Uterus* itself not only Worms of that kind, but also long ones, like the ordinary *Teretes*, among which *Stalpartius* makes his Observation: 'Elizabeth Tomboy, a Midwife, solemnly affirm'd to me, that she brought a certain live Worm from a Woman's Uterus, that was a quarter of an Ell long, that it twisted itself about the Navel-string of the Infant; a little after, the same Woman took a second Worm, but less, the Women being still present, which was seen lodg'd in the *Placenta*, or After-birth; and since the same Childbed Woman was continually complaining of a Pain of her Belly for some Days; my Brother *Job-Stalpartius vander Wiel* was consulted, who, by the Use of a certain Remedy against Worms, discharg'd, with the *Lochia*, or her *Cleansings*, a great Quantity of little Worms.' That which is worthy observing, is, that the *Teretes*, or round Worms are said frequently to run through the Intestines to the *Vulva*. But this if not frequently, at least,

'tis not impossible but it may happen sometimes, as *Worms* have penetrated from the *Guts* to the *Bladder*, which is prov'd by Examples already brought. Therefore, whether the *Worms*, of which *Stalpartius* speaks, crept into the *Womb* the same way, or they were bred there: This he himself believes. And indeed, those *Worms* which pass from the *Guts* into the *Bladder*, must come there thro' some *fistulous Ulcer*, which we cannot say happen'd in the Example brought by *Stalpartius*, since those *Worms* passed out of the *Womb* of a *Childbed Woman*, who is not said to have been sick before. Yet 'tis observable, it might be done as to the internal Parts of that Woman; tho', perhaps, it might appear that the *fistulous Passage* was small, whereby the *Worm* could creep from the *Intestines* into the *Uterus*.

I remember sometimes to have seen the Man, who to me, as well as to himself, appear'd healthy, that voided *Worms* for several Years, without any sensible Inconvenience, thro' a hollow *Fistula* in his *Groin*, as I have shewn before; nor are there wanting many Examples of the like Nature, yet I will obstinately deny that the *Teretes* or round *Worms* can be bred in the *Womb* as well as many other Parts more remote from the *Intestines*. And *Humbertius*, a Commentator upon *Apuleius*, reminds us that the *Tania* hath also been brought from the *Uterus*, tho' this Part of the Body of Woman may not be liable to any kind of *Worms*.

The Umbilical or Navel Worm.

Now this *Worm*, call'd *Umbilical*, ought not to be pass'd by unknown, whether it is believed proceed from the *Navel* as is affirm'd by many *Physicians*, and Women, especially the *Germans*. *Petrus* professes to have seen one Piece of *Excret*

of an *Animal*. ' We saw, says he, from the bottom of the *Navel*, a round longish Worm, such as are us'd to breed in Meal, stretching it self out, and then contracting or drawing it self in again. And of the Manner or Method how this *Worm* ought to be extracted, he speaks thus. ' We produc'd and extracted the Worm lurking in the *Navel*, by Application of *Lupine Flower* boil'd in *Vinegar*, without any Hurt or Danger.

SENNERTUS gives several Instances of this *Worm* in his practical Works: ' *Worms* bred in the *Navel*, saith he, which are call'd *Navel-worms*, but by many esteem'd fabulous, yet described and confirm'd by others from *ocular Demonstration*. *Georgius Breuggerus*, in an Epistle of his to *Philip Hoehstetter*, writes, that there was a young Girl of six Months who labour'd under this Disorder, with which she was very unquiet, it being attended with a pettish Fever; in which when the Medicines did little Service, the Mother of the Child, being a Woman of Quality, suspected that there was a *Worm* in the *Navel*, and apply'd thereto one of the little Fishes call'd a *Gudgeon* alive, which was bound on and left there twenty four Hours; but the *Worm* fed so upon the little Fish, that nothing was left but the Bones, and then withdrew again into the Vessel: But it happen'd after eight or ten Days, that the Bandage which tied on the Fish gave way, and was loosen'd from the *Navel*, drawing the Fish along with it; whereupon the *Worm* following his Prey got entirely out of the *Navel*, and could not find his way back again, and so was found out of the Body, extended on the Child's Belly dead, half a Foot long, of the Figure of the *Teretes*, a little broadish, not so tender and soft as the round Worm us'd to be, but harder and cover'd, as it were, with a Crust of a pale, whitish, yellow Colour. *SEN-*

SENNERTUS also relates another the like plain History from the learned *Sultzbergerus* his Friend who in a *Disputation* of *Worms* in *Men* tells the Story thus. ' An Infant of a noble Family, half a Year old, being totally disorder'd for some Days and Nights, the little Head was miserably toss'd about here and there, and the Lips of a black purple Hue; the Stools were either green, or of an Aspic Colour, like Pottage or Soup from chopt Meat. Several Remedies being tried in vain, a Gudgeon was apply'd to the Child's Navel, which being look'd upon after two Hours, on that Side on which it was bound to the Navel, a hole was made of the Size of a Pea. That being thrown away, another Gudgeon was put to the Part, which being left there all Night, in the Morning that part of the Gudgeon which lay to the Skin of the Child was entirely gone, and nothing left but a Skeleton. These things being known, the Half of a Filbert Shell was fill'd with a little Mass, made of the Powder of Venice Glass mix'd with Honey, adding thereto a little Savine, and apply'd to the Child's Navel all Night. In the Morning a good Quantity of it was consum'd; it was replenish'd again, and apply'd, and after the third Time, being removed, there was nothing wasted. Then giving the Infant Harts-horn calcin'd, in Tansey Water, and diligently watching the Excrements, which then grew foetid, the Worm was found in a Bundle, or rather the Skin or Slough, almost a Span long, the Head being broken off the Size of a small Lentel, in Shape near alike to the great Fly, yet hard, and near to each Eye furnish'd with a Proboscis plain enough to be seen, which being kept is yet visible. The Worm being thus excluded, all Symptoms ceased, and the Infant perfectly recovered. This is commonly used, as I have heard Sennertus, by our Women; if Children are

froward

forward, cry much, and the Lips are blackish with the falling down of the Head, and there are no Tokens of any other Disease, they suspect a *Worm* to be about the *Navel*, to find out which, they apply a live *Gudgeon* to the *Navel*, which if it is gnaw'd or eaten, they conclude there is certainly a *Worm* there; to kill which they mix Powder of *Venice Glass* with *Bread* and *Honey*; and some add Powder of *Savine*, then fill half a *Walnut* or *Filbert-Shell* therewith, and apply this to the *Navel* to destroy the *Worm*.

THUS far *Sennertus*. But first, we are to observe the *Worm* describ'd by *Breuggerus*, which differs considerably from that of *Platernus*, for that is a small one, and scarce an Inch long, the other half a Foot, and said to be much thicker than the other: Therefore there seems to be a different kind of each of them. In the next place let us observe the following story written by *Sultzbergerus*. Whatever *Sennerius* hath said of the former, there does not appear to be any likeness, but on the contrary a vast difference. For *Breuggerus* tells us that his *Worm* follow'd its Prey fell out of the *Navel*, and could not find its way in again. But *Sultzbergerus's* *Worm* was not only different as to Figure and Length, but what is to be considered, it did not stir out of the *Navel*; for by giving *Harts-horn* in *Tansy Water*, and examining the *Stools*, the *Worm* was found voided in *Buntings*, &c. Hence it follows that the *Worm* he speaks of was not voided by the *Navel*, but the *Anus* with the common *Stools*, so that it cannot be reckoned with the *Worms* that lodge in the *Guts*, nor yet with the *Navel Worms*. The said *Worm* crept to the extream Part of the *Navel*, and from thence put out its Head, or else the Argument of the *Gudgeon* being put to the *Navel*, and there consum'd, would be of no Force; therefore some will say from hence,

hence, that this may truly be call'd a *Navel Worm* but as to this Objection, we shall see further and by.

BUT the Observations of Physicians teach us, that some of those *Worms*, which undoubtedly inhabit the Bowels as the common round *Worms*, do make a Way or Passage for themselves thro' the *Navel*. A certain Country Woman, saith *Salmuthus*, *Ce* tur. 2. Obs. 61. came to me, and told me that her Son of eight Years old had overcome or mastered a most cruel raging Pain about the Region of the *Navel*, that had lasted almost four Years but afterwards that he discharg'd a *Sanies* or corrupted matter by the *Navel*, and at length some *Worms*, in length and form something resembling Earth Worms. When she beheld this Spectacle she committed the Boy to the Cure of a Surgeon, he clos'd or heal'd up the *Foramen* in the *Navel* which was no sooner done, but he fell into the most cruel and intolerable Pains, from which he was deliver'd by a spontaneous Rupture of the *Navel*, with a Discharge of putrid Matter, succeeded by the creeping out of some Worms, as before. But altho' you cure this Evil, and 'tis sometimes done, yet upon the *Navel* closing, it will grow worse again, as it hath done these Four Years past, and as it is at this day; wherein he consulted me, and voided Eighteen Worms of the same kind; there is a lax, soft, whitish Tumour something painful, that appears about the *Navel* from whence issues a *Pus*, or corrupted Matter.

THERE is an Observation of *Rensfelicis* in the *Miscellanea curiosa*, of an *Abscess* of the *Navel*; but it was mortal, thro' which proceeded fourteen round Worms with the Excrements, and a purulent Matter. You will find much such another History from *Zacutus Lusitanus*, of a Woman, from whose *Navel*, being

open,

When, three round *Worms* came, after excessive Pain, of the Length of the Palm of a Man's Hand, and who, by drinking a *Decoction* of *Briony Wood*, after the healing of the *Ulcer*, was preserv'd for the future from the like Misfortune. These therefore, as those seen by *Salmuthus*, may be call'd *Navel-Worms*, except it be improper, as it is to call those *Groin-Worms* that are discharg'd thro' some fistulous *Ulcers* from the *Groin*, they being nothing different from the common round *Worms* of the *Intestines*. The Judgment, perhaps, ought to be the same as that the learned *Dolaus* gives of a *Worm*, in his Epistle to *Walsch Meichde*; 'A Butcher's Daughter of this City, not yet Nine Years old, some Time ago voided a *Worm* by the *Navel*, that was furnish'd with eight Feet; that being done, she liv'd pretty hearty, only that in Winter being lame, she began to complain of a Tumour of the Belly. At last, from a small Orifice a Stream of Corruption flow'd; nay, the very *Chyle* it self, not otherwise than as if the Girl had piss'd it, which Matter her Parents collected and reserv'd in a *Pitcher*, which contain'd four Measures; after which, the Child wast-ed away, and was much emaciated; but by the external Application of Spirit of *Motherwort*, with camphorated Spirit of Wine, a consolidating Em-plaster, and the Use of Milk, and some other Me-dicines prescrib'd by me inwardly, she recover'd very well.' This *Worm* was not like the common round *Worms*, but seem'd to proceed in like man-ner from the *Guts* to the *Navel*, with the purulent Matter, especially the *Chyle*. There are also sever-al Sorts from the *Teretes*, and Inhabitants of the same Place, that are excreted by *Stool* with the *Feces*: Which *Pallinus* describes in the following Observation, and entitles, the *Navel-worm*. 'There was a Country Boy, saith the Learned Author, brought

' brought to me about Five Years old, that was
 ' tally emaciated by continual Watchings, Resti-
 ' ness, pricking, biting, pungent Pains, and consta-
 ' crying, the Lips were of a livid Colour, and the
 ' Head cou'd not be supported directly upon the
 ' Shoulders, but fell sometimes this way and some-
 ' times that ; the Stools were Flegmatick, and some-
 ' times of a Yellowish Green and Ash-colour. And
 ' after all this, there happen'd terrible *Epileptick* Con-
 ' vulsions. Presently a Suspicion arose that there
 ' were *Worms* : And since the Mother mention'd the
 ' Navel, we try'd the common Remedy. Therefore
 ' a live *Gudgeon* was bound about Evening to the
 ' Child's Navel, but with almost an insupportable
 ' Increase of Pain, which yet ceased in a little Time,
 ' and he was quieter that Night. The next Morn-
 ' ning the little Fish was almost wholly consum'd,
 ' that side which lay next to the Infant's Belly. And
 ' other fresh one was apply'd, and within Three
 ' Hours the Servants of the House solemnly affirm'd
 ' there was nothing to be found but Bones. Spasms
 ' fics were given inwardly, with which many other
 ' *Worms* were expell'd of different Sizes, Colours
 ' and Figure, one of which I saw of the Thickness
 ' of a large Pea, a yellowish Colour, with two Horns
 ' like a Beetle, or a flying Stag, brandishing his Head
 ' and could at pleasure strictly contract or dilate
 ' self. From that Day forward the Symptoms sensi-
 ' bly abated. The Women told me strange Stories
 ' of this kind of *Worm*, which are not altogether
 ' to be despis'd, but diligently observ'd. For as
 ' a Gardner may sometimes speak in season, and a
 ' wise Man learn from old Women.

Thus far, as to the Authors who have writ-
 concerning the *Worm* call'd *Umbilical*. But we must
 observe first, that those things are not said of the
Worm, or of one kind, but of many ; because

those *Worms* are different among each other, both in *Form*, *Length*, and *Size*. We may observe in the next Place, that these *Worms* are Inhabitants for the most part of the *Guts*, not of the *Navel*; and that some of them have fallen from the *Fundament*, but never have been seen before this in the *Navel*; but others, altho' they have issued thro' the *Navel*, they have crept thither from the *Intestines*; but whether they extend thro' the fistulous Ulcer from the Cavity of the *Guts* to the *Muscles* of the *Abdomen*, and perforate them, or they are thrown there by the *Abscess*, is undetermin'd. Therefore, why we call those rather *Umbilical*, than we do those *Inguinal*, which proceed in the like Case from the *Groin*, I cannot see. There remain those which may be truly said to be *Umbilical*, they are the two first Sorts of *Worms*, of which we have one describ'd by *Breuggerus*, and the other by *Platerus*, which are considerably different one from the other. Where *Platerus's Insect* can hide itself, may easily be understood, if its little Body be consider'd, whereby it can be conveniently situated in the very Cavity of the *Navel*: But there is a greater Difficulty concerning *Breuggerus's Worm*; for the *Size* thereof is much larger; so that it ought to take up more Room. The Author means, that the *Worm* inhabits or lodges in the *umbilical Vessel*; but since the *umbilical Vessels* are closed from the Birth, and changed into Ligaments, how after Six Months they were open, as those *Vessels* were in the Girl mention'd. But if we stick here, what must be thought of those *Worms*, which being apply'd to the *Navel*, devour'd the *Gudgeons*, and then retir'd into the *Guts* again, if we regard *Paullinus Sulzburgerus*? Certainly, from the *Navel*, by the *umbilical Vessels* there is no way that leads to the *Intestines* known to any Physician. Therefore, if those *Worms* are excreted by the *Fundament*, it

it follows from the Relation of those Authors, there must be a Communication from the Navel, or some Way found out, whereby the *Worms* may creep from one Place to the other; but as the first thing laid down is certain, so this latter is altogether uncertain.

BUT some will say, if those *Worms*, voided by the *Anus*, never yet reach'd the Navel, what eat the *Gudgeons* that were apply'd there? This Objection appears material, and the more, because other Authors take notice of this Consumption, in other the like Cases, as a Matter of Certainty, among whom is the learned *Mackius*, in the *Miscellanea curiosa*, 'Of *Gudgeons*, saith he, which used to be apply'd and bound to the Navels of *Children* and *Adults* in the acutest Pains and Anxieties, the Experiment is approv'd and vulgarly known. A few Days ago, two Instances happen'd, where several external and internal Medicines were apply'd in vain; that they administred to a Boy of Five Years old Two, and another of Nineteen Three *Gudgeons*, the Flesh of which being eaten, the Pain ceased, and the Gainfayers were convinc'd. The Bones of the *Gudgeons* were only left to our View but the Reason and Manner how, and by what Means the *Gudgeons* Flesh was consum'd, lies concealed; therefore we will ask the Favour of the more discerning, if they find out this, to explain and inform us.

TO the Enquiry of this Author, I will add that of the learned *Hoeckstetter*, in his Epistolatory Answer to *Breuggerus*. 'The History of the *Worm* communicated to me, call'd *Geitzwurm*, is acceptable; by seeing, I believe, what hitherto thought a Fable. I saw a *Gudgeon* consum'd eaten on one side, which I ascrib'd to the Head of the *Belly*, not the *Worm*, being ignorant how

it cou'd come there, and why it should eat the Fish, and not the Man's Flesh; and I can scarcely imagine it can be bred there. I often laugh'd at the old Woman's Medicine, which is made of powder'd Glass, Savine, and Honey; with this they cover the Navel, as if they thought to kill Rats or Mice. Our learned Colleague, Lucas Byler, relates, that he was call'd into Consultation to a Girl of Seven Years old, who was wasted away, and suffer'd great Pains about the Navel, which the Women, from the Worm they commonly call *Geitzwurm*, that is, the old Woman's Worm, judg'd to be consum'd or eaten away: On which account they apply'd *Gudgeons* three times, and thought that they were consum'd by the Worm: But since he consider'd the Matter more diligently, he says, it was rather putrified or corrupted, from the ungrateful Stench, than eaten by the Worm. The third Day the Body of the Girl was open'd, and the Skin being cut, the *Peritonæum* in that Place, from whence the Patient complain'd of Pain, appear'd eaten or corroded by an acrid bilious *Serum*, which was thought to arise from the Worm. Thus far this learned Author, which we know not whether he really credited *Breuggerus*, or that he design'd plainly to confute him; as if he only seeming-ly believ'd him, his Arguments are so strong, with which he opposes the Existence of Navel Worms: And indeed, we cannot but concede to his Opinion, we will diligently consider the Nature of *Gudgeons*, which are describ'd at large by *Rondoletius* quoted by our Author, and other Naturalists, which not being very material to the Point in Hand, I refer the curious Reader to consult those Authorities at his leisure.

Of the WORM call'd Omas.

WELSCHIUS, speaking of the *Vein*, or *Blood-Worm*, thinks there is another Sort that differs not much from this, which brings on most dangerous Consumptions, especially in Infants, of which *Zacharius Lusitanus* says thus: 'Authors assign various Causes for the Consumption of Children, one whereof I have discover'd by frequent Tryal of Medicines. That proceeds from a little *Worm* bred within, which devours all the Aliment of the Child. 'Tis a Misfortune under which Physicians often labour, whence come consumptive Children with wan or pale Faces, where the Skin seems to stick to the Bones, the radical Moisture is wasted, and Life hardly exists. In *Portugal*, where nothing is more common, they are call'd *Omas*, as if some *Evil Genius*, not a *Worm* tormented them; old Women have recourse to Fascination, and others to Charms and juggling Tricks. Physicians have attempted various Medicines, but to no purpose. Several that have been seiz'd with this Disease, and wasted so as to be call'd *Skeletons*, by God's Assistance, and some other little Helps of my own, I have restored to Health, by giving a *Scruple* of *Castor* three times dissolv'd in Milk. These, with the fat, gross *Worm* voided by Stool, are like those which we see alive in rotten Cheese, that are nourish'd afresh and made fat; for *Castor* purges away the *Mucus* and strenuously destroys the *Worms* by its foetid Odour.' Now, what Part of the Body this *Worm* infests, our Author does not determine; but where ever it is, if it can be any where, who can believe that so minute an *Insect* can eat up all the Food of a Child? Nay, who can believe that one *Worm*

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found not only in the Heart or Brain, but in the Guts, in which Thousands of *Ascarides*, and the like, so injurious to the Body, should raise such Disturbance? It would be a Shame that such Absurdities and idle Fables shou'd be seriously related by Physicians.

Rough or Hairy WORMS.

WHAT hath been said, may seem sufficient, concerning *Worms*, either scarce or common, considered, as they possess the different Parts of human Body. It remains, that something be said of *Hairy Worms*, from what Part soever voided or discharged. Of these neither *Fernelius* nor *Platerus* singly make mention; but there are many *Species* describ'd by Physicians, beside the *hairy Tania*, of which something before. A Matron of a noble Family, saith *Morardes*, returning from *Peru*, told me she had been sick many Years; and after she had imploy'd several Physicians, she at last met with an *Indian*, who was reckon'd eminent for his Skill in Plants, and practis'd among the Natives as a Physician, who gave her the purify'd Juice of *Vervain*, by the Use of which, after some Days, she voided an *hairy Worm*, she term'd a *Snake*, a Foot long, with a forked Tail, and then was perfectly well. But it is said, there are *Indian* Physicians who pretend to heal all Parts of the Body that are in pain, by sucking; and that they may the more easily persuade you to this, they affirm, that by this Suction they attract *Salamanders*, and I know not of any Insect-Monsters that are mix'd in the Blood and Humours, which they carry about with them privately, and afterwards feign or pretend to void or cast out of the Skin: Now, 'tis a Question whether that *Worm* was brought from the Matron's Body, or procur'd by some *Legerdemain-Trick* of those Jugglers?

glers? *Benivenius*, in a Treatise of his, of the secret Causes of Diseases, says, a *VVorm* was cast up, by Vomit, that was Four Fingers Breadth long, and, which is yet fuller, it had a red, smooth, round Head, which did not exceed the Size of an Hair, perhaps it might be a *Pea*, that is *Pisicæ* instead of *Pili*; the rest of the Body was cover'd with a soft, downy Hair, with a forked Tail in Resemblance of a *Crescent*, supported by Four Feet: Shewing the Form of this admirable Worm to several learned Physicians, I never met with one who could say he had ever seen the like Monster. But there was an old Man present, tho' unskilful in Physick, who attested, that he had seen such a like *VVorm* forced by Vomiting from a certain Monk, who, as soon as he had thrown it up, died. He named this Monster a *Heart-VVorm*. But, on the contrary, our Patient, upon vomiting of the first *VVorm*, recover'd his former State of Health. So *Fallopious*, by giving a Medicine to a certain Boy, he voided, upon taking thereof, Forty *VVorms* in an Hour's time, among which was a black, hairy, two-headed one, that liv'd Three Days. *Gabacinus*, in his Commentary on *VVORMS*, in the City of Rome, brought from an old Man a black Worm well furnish'd with Hairs, of Five Foot long, and of the Thickness of a Reed or small Cane. There are other Examples, among Authors, of *Hairy VVorms*; nor will I deny but they may be met with; but the Wonder is, how much these kind of Worms now describ'd, differ among themselves one from the other.

The Consideration of Monstrous Worms. Some say, all *VVorms* are monstrous, and therefore every one of them are of a different Form; but

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this is the more to be suspected, and even those Things, which have the Face of Truth and Certainty, not to be admitted without Enquiry. For as Science improves by Experiments, or diligent Observation, so Error increases by Credulity, is an Adage brought from the Arabians by the learned Redi, in his Generation of Insects, and ought to be written in Letters of Gold. Among Insects indeed, as well as other kind of Animals, Monsters may sometimes be bred. So also monstrous Worms may sometimes be generated; but therefore we are not to believe all sorts of Stories carried about upon this Subject, or which we meet with in Books, since all do not treat of Worms alone, but oftentimes of other Monsters; and a great many Fables are interspers'd among a very few Truths. Therefore I shall pass by all the vain Speculations and false Reasonings under Philosophical Terms, contenting myself with bare Facts, thro' the Love I bear to Probity and Truth; and being conscious to myself of my own Weakness, I did not care to give Credit to any thing but what Reason join'd to Experience should confirm. For which Reason, since the first Head of the Tania, which is not monstrous; but as it hath rarely been seen, I have thought proper to present to your Sight, and thereupon have call'd Witnesses, and those not of the ignorant Vulgar, but some of which are endow'd with many excellent Qualifications, and such as have refused to believe me, but now cannot deny their Assent to what their Eyes have seen. But if any shou'd be so forward to urge, that there is not that Certainty altogether, since both himself and the Witnesses produc'd, contend that we may be deceiv'd in some Part, the Person thus urgent will not find me so contradictory, but that I may allow there are Examples of Facts, in the relation of which there is not that full and plenary Certainty

and Satisfaction. Things being thus explain'd, I shall decline to relate any thing further concerning monstrous *Worms*, lest I my self seem to be a Teller of Tales, or at least to vend Uncertainties for Certainties.

The Kinds of *Human Worms*, living without the Intestines, are difficult to be distinguish'd from one another.

It remains, that whereas the *Species* of *Worms* inhabiting the *Guts*, already treated of, not the monstrous *Worms* which are said sometimes to infest other Parts of the Body, are also peculiarly distinguish'd; but this hath been hitherto difficult; because, these having been in a great Measure less accurately describ'd by Authors, are for that reason less observable. As those, first of all in *ἀνοδᾶς*, or which have Feet given to them, like the *Millepedes* or *Palmer-Worm*, as some may distinguish; but this Division seems to be more general, since both Kinds can be divided into several *Species*. Neither have we, in the second Place, distinctly enough remark'd all their Differences, if we reckon them from the different Parts of the Body in which sometimes they are found; and so we call them *Cephalic*, *Cardiac*, *Pulmonic*, *Hepatic*, *Nephritic*, or *Uterine*, &c. For as several Kinds of *Worms* may be troublesome in those particular Parts, as is observable in *Worms* of the *Guts*; so also, one and the same Kind, wandering from one Part of the Body to the other, is not impossible to be met with in various Parts. So the *Ascarides* sticking to the Fundament, are, perhaps, like those that are found in the *Vomb*; nor do those, it may be, differ from either, which not being unlike in the external Figure, are said to be excreted sometimes with the Urine; as neither are those other small ones observ'd in *Ulcers* and *Apostems*. But

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the thing seems dark concerning the little *Worms* of the *Teeth*, and still more obscure, in relation to those of the *Blood*. But the *long round Worms* differ most from all these, especially, the smallest Sort like Hairs, which we have already observ'd are found in glandulous and other Parts. Now whether these are of the same Stock or Kind with the *Vena Medica* *Worm*, which in Figure they seem to resemble, or they are different, let us see, lest we confound all those Kinds; but on the other hand, take care that we do not multiply them without Necessity; but we shall be blameless, if we determine nothing on this Head, 'till we have more Light, whereby to understand the Matter clearer. As to the Authors, on this Particular, you may consult *Marcellus*, *Donatus*, *Schenckius*, *Velschius*, *Paullinus*, and *Vagnerus*.

WORMS that procure singular Diseases, beyond the Course of others.

WHAT relates to this Chapter I shall entirely take from the celebrated *VVedelius*, who hath perform'd so well upon the Subject; and therefore I shall take it from his own Words: 'The Power and Efficacy of *Worms*, saith that learned Author, to procure Diseases, is not larger than it is reasonable to be extended; and here we will take the middle way. All things are not from *Worms*, but some are. The Vulgar have not only err'd in this, but Physicians themselves, and that often, beyond which it is not fit to proceed. For, the Plague does not arise from an animated or living Putrefaction. Kircher produc'd this Opinion upon the Stage, in his Treatise of the Plague; from whence they asserted, that the Air might be demonstrated to be verminous by the Microscope. But this Hypo-

thesis was not such, as, properly speaking, they could believe explain'd the Nature of the Plague. For, as it was not deny'd, that *Worms* were frequently generated in the *Plague*; so it did not follow from thence, that those *Worms* were Authors of it; or as *Conringius* speaks in his *Dissertation* of the *Plague*; nor is there any Force of Consequence in what *Kircher* saith, that *Worms* are frequently generated or bred in the *Plague*; therefore that *Worms* are *Seminaries* of the *Plague*.

A verminous Putrefaction is not found in all Diseases arising from Corruption; therefore an animated Pathology does not take place. The further Progress of *Cangius* is remarkable, who publish'd *Kircher's* Treatise of the *Plague*, that he hath written this living Pathology, built upon a few Experiments of *Kircher*, who says, that in all Diseases proceeding from Putrefaction, there may be found a verminous Corruption, whence comes *Epileptic Convulsions*, torturing *Gouts*; stubborn *Headachs*, and *Pleuritic Pains*. So he concludes from these Principles, that the *Small Pox*, also *Measles*, and most other Diseases, are nothing else but *Worms*; or where there is Pain, there is a verminous Corruption or Consumption from *Worms*. Where there are *Ulcers* there are *Worms*; that all *Pus* is nothing more than *Worms*; nay; that in other natural Bodies; for Example, that the Light of rotten *Wood* proceeded from *Worms*.

In assigning the Causes of Diseases, and their Phenomena, the Course of the Things that produce them is not to be excluded. Hence, that we may say with *Schenkius*, that *Worms* bred in the Blood and out of the Blood, declares no other Vice than what belongs to the Quality, and consequently to the *Cacochymia*. But since the verminous Matter is said to do this, nothing is to be gathered

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gather'd from thence, more than what hath long since been said of *Worms*, to wit, that it is the Cause of many *Symptoms* and *Diseases*. Therefore *Worms*, if they are conjoin'd with the *Scab*, *Small-Pox*, *Ulcers*, *Tumours*, *Pains*, &c. are rather the Adjunct, and also, sometimes the Product, than the principal Efficient, tho' not universal Cause. Some *Pains*, *Tumours*, *Ulcers*, &c. arise from *Worms*, or have *Worms* join'd with them; but every one hath not so; for there is no Consequence allowable, to argue from a Particular to a General. But 'tis sufficient that in the Course of these Causes some *Worms* are found, and those sometimes by themselves, and sometimes are met with among other Things. *Simon Pauli* will not allow *Worms* to be in the *Blood* of feverish Persons, in his Digression of *malignant Fevers*. And *Martin Schoc-kius*, in his *Treat* of *Fermentation*, is of the same Opinion.

CHAP. XIV.

Of the Origine of WORMS living in Animal Bodies.

THE most difficult Question remains yet to be discuss'd, to wit, From whence the first Seed of *Worms* is deriv'd? *Hippocrates* long since observ'd, that the broad and round *Worms* were found in Children just excluded from the Womb; as may be seen in his Works, where

where he asserts, that many healthful Children, after they have receiv'd Food, have voided both round and broad Worms in their first Dung. *Dolæus*, likewise taking notice of Worms, in his 6th Book, Ch. 1. of the *Diseases of Infants and Children*, says, 'That the *Fœtus* in the Womb is not free from these Worms, as I myself, saith he, have seen in a dead Child, just taken from the Birth, and open'd by me, in which I found a Knot of Worms.' The same says *Valisnieri*, and affirms, that he hath seen them both in humane and brute Bodies; and *Caspar VVolphius* saith he hath seen in new-born Children, and some few Months after the Birth, Worms, some whereof were broad, and also one of the *Tania* or taper Worms almost three Ells long, which the Observations of *Hippocrates*, *Dolæus*, and *Valisnieri* confirm. But whether this is common to all Men; or whether all Men who are subject to Worms the remaining Part of their Lives carry those Seeds in their Bowels from their Birth, ought first of all to be enquir'd into. There is yet sufficient Cause to doubt the Truth of bringing Worms from the Womb; from the Examples of those who only have the broad Worms in old Age, hath been mention'd; where that Insect lay hid Fifty Years, or more, in which Time it either did not appear, or else was bred. Some will say, perhaps, this receiv'd its Birth with its Host or Entainer, and sometimes will not part with him, when both are ready to quit the World. This is scarcely credible, if so long an Interval of Years be considered as I have granted, and which *Hippocrates* asserts of many Children, that the *Fœtus* itself is afflicted with Worms in the Womb; we must enquire, in the next place, how these Worms came there. Neither is this Difficulty much less, I confess, if it be granted that Worms are generated before the Birth, after the Birth, or in adult or aged Persons; for the Quo-

returns to its former Point, to wit, From whence came these Insects in all these Bodies? The Difficulty is equal on both sides.

The Ancients found out an easier and more commodious Way, which help'd 'em out in these abominable Secrets of Nature, by asserting, that these Worms, as well as many other Kinds of Insects, were form'd from themselves out of a certain putrify'd Matter, by the Help and Assistance of Heat and Motion. And this Opinion so prevail'd, that it was incontestably receiv'd by all, even to this last Age, 'till from the Experiments of the industrious Boerhaave, and others, it was demonstrated, that the Generation of Insects, and other living Creatures, was not the same; and the contrary Opinion exploded.

It is strange, that such an Opinion should obtain so long, since the same Argument destroy'd the System of *Epicurus*, who had form'd his World on a fortuitous Concourse and Motion of Bodies. And if a putrify'd or decay'd Flegm or Slime can assume the Form of a *Worm*, why must it be always in the Form of this sort of *Worm*? Or why otherwise are there so many different Forms of *Worms*? But this is the *Worm*, as it hath been describ'd, the Ancients form'd Twenty Ages ago, and we at this Day don't alter it any ways chang'd, neither will our Posterity; which could not be, if nothing occur'd besides a Motion of Corruption. There are others, however, who were not Followers of *Epicurus*, who, when they cannot make their Heat and Motion answer, have recourse to celestial Bodies, and odd occult Qualities. 'The external efficient Cause, says *Mercurialis*, of *Worms*, is nothing else but a certain celestial or heavenly Power, which, by the Mediation of proximate Causes, forms Animals: Which, whether it is the *Facultas fortuitrix* of *Galen*, or that potent Factor *Caleodea* of *Avicen*, or

‘ or the *Anima Mundi* of the *Platonists*, we shall
 ‘ dispute in this Place.’ Thus far *Mercurialis*.
 it would be useless to dwell longer upon these
 authorities, since we have a wiser Sect of Philosophers
 who have firmly, and with one general Consent,
 exploded equivocal Generation at this Day, and
 sign’d the vilest Insects, whose Origine was forme
 drawn from Corruption, the same Parent as the m
 noble and perfect Animals. If therefore the mi
 test Worms, or even Mites, which are in Cheese, a
 the like, and therein appear in vast Numbers, co
 monly suppos’d to be form’d or bred from a corru
 ted Humour; I say, if these *Worms* have lar
Worms for their Parents, what must those be wh
 are bred in Mens Bodies, of which the largest S
 is the *Tania* or *Tape Worm*?

But the greatest Difficulty still remains; for
 lowing that *Worms*, especially the *Tape* Kind,
 produc’d from Eggs, we must enquire in the n
 place, From whence, and how those Eggs can
 detain’d in the humane Body? The learned Writ
 on this Subject answer, That the *Seeds* or *Eggs*
 deriv’d from the Atmosphere, from Fruits and V
 ters which we receive by Air, Eating or Drinkin
 so that from these Eggs incubated in our Bow
 this verminous Production may at length be hatch
 and brought to light. But even this Argum
 clearly shews, that this Opinion could not be su
 ported, as the accurate *Valisnerius*, handling t
 Subject thoroughly, makes most evidently appea
 as I shall shew from himself, in his *Origine of Worms*.

‘ AMONGST most Men, says that learned A
 ‘ thor, who are read in Philosophy, it is an univ
 ‘ sally receiv’d Opinion, that every Animal, M
 ‘ himself unexcepted, is bred from an Egg. Inse
 ‘ themselves, who have an æquivocal Cause for th
 ‘ Being, as the Schools say, viz. Putrefaction, t

is before taken notice of to arise from Eggs, in the Form of small *Worms*. *Oligerus Jacobus*, speaking of them, says, they mount Heaven by a wonderful Change, and the Assistance of Wings. But this Doctrine would be much more clear'd up, if learned Men, who treat of Insects, in relation to Men, and other Kind of Animals, would not determine, from or with what sort of Eggs these are bred. They think it sufficient to affirm, that every Thing on Earth is full of Eggs, visible or invisible, which we unknowingly draw in with our Food or the Air we breath, and in which they float : Thus being willing to avoid the equivocal Reason of Putrefaction, they fall upon another fatal Rock equally to be dreaded ; forasmuch as it is equally dangerous to true Philosophy, whether we believe Animals are bred out of Corruption, or we maintain that there is a certain Kind of Animal produc'd from the Eggs of another Kind, and so confound their Kinds ; giving to some Insects feign'd Fathers, and to others Bastard Children. For, as a Serpent is not hatch'd from a Pidgeon's Egg, or a Mouse from a Serpent, or a Fish from a Mouse ; so, certainly, a *Worm* comes not from a *Butterfly*, such as are either upon the Surface of the Earth, or those found in the Entrails of Beasts ; neither will you produce a *Bee* from an Egg of this *Worm*, or a *Shrimp* from a *Beetle*. This is a perpetual Law of Nature, that every Animal and every living Creature should beget its Like, &c. I say, there are several sharp Wits among the Moderns, who think they have done a great deal, since they have rejected Putrefaction ; and persuade themselves they have split the Hair, in affirming all Animals, as well Men as the Worms in Insects, are bred from Eggs, which they eat, and drink, and breath in with the

the very Air, as well as what they receive from
 Fruits, and Herbs, and Water; but those which
 are in Fruits, and Water, and Air, are not of
 the same Kind with the Worms contain'd in Bru-
 and humane Bodies, which those learned Gen-
 men have not sufficiently weigh'd. For, I guess
 there are a great many Eggs of the Vegeta-
 Kind daily devour'd by us; but these never
 breed in the *Intestines*, or are excluded thence;
 if they were generated there, which I can scarce-
 ly allow, those tender *Seedlings* would scarce-
 breed for want of proper Aliment, and Nest-
 Beds accommodated to their *Species*; or else
 enjoying the Benefit of the Air to which they
 were accusom'd, undoubtedly they would per-
 ish, or lastly, thro' the too immoderate Heat of
 Bowels, and the active Ferments therein, be
 suddenly destroy'd.
 But allowing those *Worms* to be nourish'd
 us, and that they may have apt and proper
 so as to bring them afterwards to a just Size
 Maturity, by changing them into a sort of *Bee*
flies, that then they might be like their Sires,
 become volant; what would all this signify
 Where they find a Place proper for their
 wherein they could rest without Disturbance
 they would there perform their *Metamorphosis*
 Changes, according to the immutable Laws
 pointed by Nature. I have a Hundred Times
 observ'd those *Worms*, if they meet not with
 proper Place suited to their Ease certainly
 perish. Since therefore almost all *Worms* that
 at any time seen in Fruits, Waters, Plants, &c.
 &c. are of that Nature, that in their proper
 fons they fly, we need not fear these will breed
 our *Bowels*; or if there, that they will live
 But allowing these to be of such a Kind as do

fly, and still continue *Worms*, which are few, this Kind will be altogether different from that, which is natural to the Bowels of Men; so that it is ridiculous to confound the Sorts of *Worms* which are Strangers to, and disown such illegitimate Parents, as we observe hath been done by so many learned Men. To this we may also add, what the same Author says to this effect.

Worms, or the lesser Sort of *Worm-Flies* of different Kinds, feeding on Herbs, Flowers, Fruits, Wood, or any decay'd Body, such as are to be met with on Land or Water, or such as adhere to the Body of *Animals*, or are found in the inward Parts thereof, if any Body, which is an easy Experiment, remove them from their usual Food or Place of Abode, he will see 'em die in a short time. This is a very common Tryal in *Silk-worms*, which, if their Food or Diet is chang'd, or they be mov'd from their usual Place, or into a colder or sharper Air, presently die. The same happens to all the rest, as I have try'd a Thousand Times. *Worms* that are bred in *Fruit*, are us'd to feed upon *Fruit*; those bred in *Flowers*, on *Flowers*; and so of *Flesh*, *Wood*, *Plants*, *Roots*, &c. the Food or Aliment proper for each Kind of these *Worms*, is only to be found at the Place of their Birth, if I may so call it, or where they were bred, neither will they produce elsewhere. It is the same of those bred in the Water, their Food is only to be met with there; and so you may form a Judgment of all the rest. Nay those which are bred to one sort of *Fruit* will not eat another; and even of the same Plant, one feeds upon the Leaf, another the Root, a third the Flower or Bark, otherwise it will die; and this we affirm happens to all of them. This Mons. Andry confirms, in his Second Chapter, saying, as the *Worms* which eat

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the Pease are different from those which eat the Chervies; and in his Third Chapter, Every Plant has its particular Worm, its particular Fly; nay, every particular Part of the Plant affords Nourishment for a different Sort of Worm; according to a celebrated Florist, who says, *We find Worms upon Pimpernel, Wormwood, and several other Herbs which are all different; and accordingly as these Worms come from Plants, some are particularly related to the Branches, others to the Leaves, others to the Flower, others to the Root, and some to the Grain; and yet these are of different kinds.* If therefore we are greedy, and this seems to be a certain truth, while we are eating Fruits and Herbs, if we receive with this Food, the Worms, or their Eggs, sticking to it, which may easily be done; I say, can we believe that those very Worms who are in another World from their own, viz. in our Bowels, being afterwards chang'd and fed with another Diet altogether different from its former State; I say, can we think these can live, breed, and increase? It is certain those will not live which feed upon the fruit of an Apple, if you take 'em thence, and attempt to do it with the leaves of the Tree; neither will it succeed the contrary way: And since things are thus, who can persuade himself that those Worms which come into the Viscera can be supported alive, since their Nature is so changed in the Change of place, and in the Diversity of Juices so contrary to their former Condition? Life?

But let us return, says our learned Author, of Worms most familiar to human Bodies; and let us ask the wise Enquirers into Nature; whereas Worms outwardly give Pain to Men, whether they ever see these, or any like them, abroad in the World? They will answer, No. What then? Whether

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learned Men are so fenced in by the Laws of Nature her self, that thro' very Spight they will affirm other *VVorms*, whose Heads are arm'd with Horns, the Feet cover'd, and interwoven as it were with hard Nodes, and which are extreamly small, and at last subject and apt to fly ; in short, whose Structure, Size, and Use, from the common Sort, is altogether different, to be the Fathers, or Producers of these *Worms* ; which, if we admit, as I have observ'd, every body may see what Confusion it will introduce, and pervert every thing design'd for the Discovery of Truth. For hitherto I never could find *VVorms* of the same *Species* with ours, tho' I enquir'd after 'em with the utmost Diligence ; tho' I have collected Thousands of Insects, with unwearied Toil, great part of which are still extant in my *Museum*. I know, indeed, there are Authors, among whom is *Harderm*, in a certain Epistle of his, who thinks our *Teretes*, or round *Worms*, have their Origine from the Earth ; because there appears some Likeness in them to the *Earth-Worm*, as to the external Form. But a Dissection of mine of both these Kinds will persuade them otherwise ; because there was a different Position of the *Viscera* in each. And of these, as well as a Difference in the Figure ; from whence any body must infer, that they are two kinds of *Worms* : The same is likewise observ'd by the celebrated *Redi*, who did likewise himself analyze and classify those *Worms*.

THESE learned Men answer, that *Worms*, like those which live on the Earth, if accidentally remov'd within the Body, and are made Inhabitants of a Place altogether new and different, may admit of a Change, in respect of their outward Colour and the Softness of their Body ; and so also as it has Relation to the Fabrick or Make of the *Viscera*. But yet I cannot understand how this unaccustom'd

Change can happen so contrary to the ordinary Process of Nature, the great Mother of all things. Altho' the Colour and Roughness be chang'd, and also the Disposition; the Canals or Ducts more or less dilated or constringed; the Humours alter'd; the Fibres lengthen'd or shortned, the Parts at last grow soft, and are made flexible, and such a Change made in the Order, Disposition, and Situation of the Tubes and *Viscera*, that the Passages which were before shut up, are now open'd afresh, &c.

THESE are the chief Arguments our late Writers make use of, whose *Hypotheses* the learned *Valisnerius* hath overthrown. But in these Arguments two Errors are principally confuted; the first is, that of those Authors who think to establish these Eggs from flying Insects that had been Worms before, which any one may see to be an Error in its own Nature. But the other is admitted from those who believe the same Eggs may take their Forms from *Worms* never afterwards to become volant, or so much as ever have Wings. The celebrated *Leuwenhoeck*, speaking of *Worms* that are met with in the *Viscera* of Fishes, affirms, that there are many minute Worms the Eye cannot discern, which swim in the Water we daily drink, which he thinks may be easily brought into the Intestines of Infants. There are many Men, says *Leuwenhoeck*, 'that drink
' Water, and tho' they do not drink Water, yet
' when the Glass or Cup they drink any other Li-
' quor in is wash'd, some Drops of Water will stick
' thereon, in which the minutest Worms may be
' contain'd. Besides, young Children, in Summer-
' time, frequently drink Milk, with which Coun-
' try-People, and sometimes others, often mix Wa-
' ter; and especially *Whey*: Which, since 'tis so,
' 'tis no Wonder whence *Worms* should breed in the
' Guts of Men, Animals, and Fish. And *Leuwen-*

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boeck, in the same *Epistle*, asserts, that he saw Eels
 which had *Worms* in their Bodies, like those which
 are voided from Men; which ought not to be
 understood of the round, but broad *Worms* also, which
 were seen likewise by him several times in other
Fishes as well as *Eels*. But this Opinion of *Lewwen-*
boeck is not loaded with so many Difficulties as the
 former, in which the Origine of *Worms* is supposed
 to be taken from *Worms* which are not always Bree-
 ders, and likewise from those which are very unlike
 the *Worms* that afflict Mankind. Yet Objections re-
 main to be solv'd taken from the Place, in which
 the aquatic *Worms* of that Author ought to be
 excluded or nourish'd, to wit, in our Bowels; which
 Exclusion or Nurture *Valisnerius* denies can be per-
 form'd there; and that supported with such Argu-
 ments, whose Strength is not easily master'd. Let
 us examine candidly whatever hath been, and see
 whether *Lewwenhoeck's* Cause can be maintain'd with
 any Colour of Reason. It is difficult, nay, very
 difficult to allow, that those *aquatile Worms* can
 live within the *Viscera* of Animals, or that their
 Eggs can be excluded there, according to the Rea-
 sons laid down by *Valisnerius*, if you will adhere to
 the *Hypotheses* establish'd by *Lewwenhoeck*, the Fact it
 self demonstrates the Thing in its Consequence dif-
 ficult; for tho' every single Drop of Water, accor-
 ding to *Lewwenhoeck*, abounded with many small
Worms, and a great deal of such Water was daily
 drank by Men and Beasts, in which Millions of
 those little *Worms* should be, yet very few of these
Worms bred from hence would be to be found in hu-
 mane Bodies; nay, we have a great many Men who
 live free from *Worms* of any Kind. And first of all,
 grown Persons are rarely troubled with these Insects;
 because they abound with *Bile*, and other acrid
 Humours, which are Enemies to their Nutrition and
 Growth;

Growth ; therefore their Increase and Support is difficult, tho' not impossible ; likewise aged People seldom or never void *Worms* by Stool, or otherwise ; but Infants, or Children, whose Bowels are water'd with softer Juices, are chiefly subject to *Worms* ; because those Juices are not so opposite for Nourishment. The same Aliment is also difficult, as well as the Stoppage of those little *Worms* in the Guts, by reason of the Quantity of Juices crowding in, and the continual carrying off the *Feces* by Stool, whence this minute verminous Off-spring is daily discharg'd ; yet it is not impossible, because in the Foldings of the Guts, and the Cells of the *Colon*, or bottom of the *Cacum* or *blind Gut*, some *Worms* may remain, which being cherish'd by the Warmth and Heat of the Place, join'd to that of Moisture, becomes proper for their Nutrition and Increase.

THIS being laid down, the greatest Difficulty propos'd by *Valisnerius*, seems to be resolv'd : Nor can the Advocates of *Leuwenhoeck* shew, with greater Strength, why the first *Seed* of our *Worms* should be procur'd from constant Water-drinking. For altho' *Leuwenhoeck*, in the first place, shews innumerable Quantities of small *Worms* swimming in those Waters ; and in the next place says, he hath found *Worms* in the Bowels of Fish, which are the same with the former, or of the same Kind ; whence it follows, that Fish being perpetually in Water, necessarily receive their *Worms* from the Water, neither can they have them elsewhere : If therefore that be the Original of *Worms* found in Fishes, what should hinder it from being the same of those *Worms* which are discover'd in the Bowels of Men, Dogs, Cats, and other *Animals*, since Water is not only the common Drink of Fish, but of all *Animals* ? What, because the Form is the same of *Worms* found in Fishes, if we believe *Leuwenhoeck*, and he

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himself thinks those Worms of the same Kind with Worms taken from the Bodies of *Dogs*, *Cats*, and many other *Animals*.

THESE are what plead for *Leuwenhoeck's* Opinion: But it is easy to answer, first of all, how much it avails to the Argument, as the Author supposes, to prove the Number of Worms taken in by us in constant drinking of Water; for, from thence we can conclude nothing for the Possibility of feeding or nourishing those Worms in our Guts. For as Fish in any Number taken from the River, and thrown upon Land, would all certainly die in a little time, and all the Men in the World, if they were immersed in Water, so as to be excluded the Benefit of Air, would every one of them die in a few Minutes, and the Worms bred in them, tho' from Water first deduced and accustom'd to live in their Bodies, let their Number be what it will, would all equally alike perish in the *Viscera* of those Animals. Neither will it be difficult, according to *Leuwenhoeck's* Argument, to invalidate his Reasoning built upon a Resemblance of the Form of Worms found in the *Viscera* of the aquatic Kinds, as well as other Animals. Notwithstanding many things, at first sight, appear like each other; which, diligently consider'd and compar'd together, have little or no Likeness; so Land-Worms with the *Teretes* or round Worms in humane Bodies, except the Colour appear alike, yet they are nothing of the same Kind with them, since there is a considerable Difference, as to the Anatomy of their Parts, both internal and external, as hath been observ'd before. Therefore without *Leuwenhoeck* will shew the Parts of his *aquatic Worms* to be the same both internally and externally with those observ'd to live in the *Viscera* of Animals, no body will believe all those Worms to be of the same Kind; but such is the Smalness of those

Worms seen by him in the Water, that they are scarce discernable by the Help of the best *Microscope*, and consequently cannot be examin'd, as to the Formation of their inward Parts. There are innumerable and variously-form'd Sorts of *Worms*; but it does not thence follow, that any of them are to be met with, that are in every part like those in our Intrails, except in very deed such Worms were produc'd, which, without the help of a *Microscope*, might be examin'd by the anatomical Knife. But, if any thing should appear doubtful or uncertain about the *round Worm*, there is no body ever yet produced the *broad Worm* or the *Tape-Worm* of the first Kind, either from the *Sea*, *River*, *standing*, or other sort of *Water*, but only from the Intrails of an animal Body.

THE learned *Hartseker* perceives this Difficulty, and therefore wou'd gladly assign us another Origine of the same *Tania* which might be consistent with Reason, and which he attempts after this Manner, in his Letter to Mons. *Andry*. ' Were there ever
' seen on Earth *Worms* of this Kind, which were of
' such a vast Length? Altho' learned Men say, that
' it is from the great Quantity of Food which these
' *Worms* receive among the Guts for their Supply,
' and for this Reason they grow so long; but this
' is not satisfactory. This Worm since it is scarcer
' in *France*, but more common in *Holland*, and in
' watry dirty Soils, we may suppose it lies im-
' mersed deep in the bottom of the Water; and
' thence, it is not impossible that the Eggs are
' swallow'd in drinking the Water or some other
' way. But had it been so, why were none of these
' Worms yet found in the Mud? I have thought
' they were created with Men, and that their Spe-
' cies is coeval with that of Mankind, just like
' that of *Lice*, which yet is perishable I own, since
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Mankind is the same. Farthermore I am of opinion, that those *Worms* generate in the Guts by Conjunction, as Male and Female; so that if any of their Eggs are voided with the Excrements, and fall upon the Grass or other Part, and happen afterwards to be received again, these Eggs thus excluded are the Origine of these Worms that are from thence bred in the *Viscera* of humane Bodies.

THU'S far *Hartsoeker*, whose ingenious Reason is help'd in his last Words; whence the Propagation of that Worm may be made; but whether another way may be found, whereby it may be propagated, we will see anon. But those Things are worthy our Attention which he first publish'd concerning the first Origine of the same Worm. Certainly our *Tænia*, as other kind of Worms, I shall not pass by or forget, as a Stranger or Foreigner to the human Body; but as there never was or could be any other, as a Native only, besides that Worm; for none ever yet inhabited any place without the Body of Man. The *Tænia* therefore, or *Tape-Worm*, is bred or generated in Man and with Man; and all other Worms have their Course of Generation. *Lice* have the same Original, but differ according to the Nature of the Animals on which they are bred or produced; so that, for Example sake, those troubled with a *Crow-Louse*, shall never find that of a *Pidgeon*, *Hen*, or any other kind of Bird, upon his Skin. The ingenious *Redi*, in his Book of *Insects*, hath given us Figures of these *Lice*, and others, common to several Sorts of *Quadrupeds*. Who would not stand amaz'd to observe the great Variety, that there can scarcely be any common Cause assign'd of the Origine or Beginning of these Insects? For if there was a common Cause, why must every distinct Kind of Animal bear their differ-

rent sorts of *Lice*? So that those which are Enemies to Men, have no Variance with several Kinds of Brutes; and those *Lice* which punish some Brutes, spare Mankind, with some other, or at least will not breed with them. The ingenious *Valisnerius* says, that there are *Worms* usually found in the Nostrils, and in the Forehead of Sheep and Deer; and that he is of Opinion, that the Hides of Oxen, &c. are eaten by the Eggs of certain Flies deposited there; but, saith he, I do not think we can say the same of the *Lice* or *Worms* of other *Worms*, as depicted by *Redi*. Certainly, if the Insects of one Kind breed in any common Place, viz. in the Water, or Earth, or Atmosphere, or Air, from whence they might fly into Men, or other Animals, it would scarce be possible but that one and the same Kind of *Insects* should swarm upon several Kinds of Animals; but since it is contrary to Experience, and that there are particular Sorts of *Lice* proper to every distinct *Species* of Animals; therefore, in the proper Body of each single Creature of the same Kind, where particularly, and no where else, are they to be found; we say they are generated and bred; and we affirm the same of all *Worms* within us, which are all common to us with *Lice*.

WE have already had *Hippocrates's* Opinion, that the broad *Worms* breed in Children, even while in the Womb, and taken the Observations of modern Physicians, which the Assertion of antient Authority confirms. Amongst these, the judicious *Valisnerius* explains the Origine of *Worms* found in the *Viscera* of Infants, thus; 'The *Chyle*, saith he, appointed for the Nutrition of the Child, is first elaborated in the Mother's Stomach, as all know; and from thence as it is farther prepared, and the impure Parts separated from the pure, it flows to the *Intestines*, being filter'd through the Pores of

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Glands thereof. This being granted ; since the *Guts* are the common Residence of the Worms, and the Mother nourishes the *Fœtus* several Months in the proper Womb ; hence it comes, that the Eggs of the material *Worms*, or the smallest *Worms* met with in the Mother's *Intestines*, mix'd together with the *Chyle* in the usual Ducts, are carried to the Membranes that inclose the *Fœtus* in the Womb. And from hence it may be easily understood how the Infant receives that verminous Wrapper with that Juice or Liquid into the proper *Viscera* ; and from this Example may be learnt without much Trouble or perplexing our selves with Multiplicity of Opinions, after what manner, and how we often find the Seeds of Good or Evil in our selves. But if the Mother is free from Worms, as casually it may happen ; or if the *Worms* at that time of her Pregnancy *spawn not*, if I may be admitted that Term, then indeed the Worms cannot communicate themselves to the *Fœtus* that way ; but perhaps another Woman who abounds with Worms, by giving her Breast to the Child, will equally communicate those Eggs along with the *Milk* ; because the *Milk* little differs from *Chyle*, and the *Chyle* is brought directly from the *Intestines* to the Breasts.

But we may enquire in the next place, from whence that *Mother* or *Nurse* receiv'd these *Worms* ? If they are said to take them from their *Mothers* and *Nurses*, and these from others, since we are all of one Blood, we may gradually ascend to *Adam* and *Eve*, e'er we find out the first Origine of these *Worms* that affect human Bodies. And then, when the *Seeds* of all things, without Exception, were created from the Beginning of the World, *Worms*, undoubtedly, will contend for Antiquity with Mankind. And notwithstanding the Worms that inhabit the Bowels of Men are never found without the Body, it would
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not be reasonable to deny, but that the *Seed* of them was created and contained in the first Man and first Woman, according to *Hartsoecker's* Opinion, which *Valisnerius* defends in another Place.

But allowing this, still a new Difficulty arises for since there are none but what are born or derived from the first and common Parents of Mankind none ought to be free from these Kind of *Worms* which appears contradictory to Experience. *Theophrastus*, in his History of Plants, and *Pliny* from him write that there were whole Nations, to wit, *Thracians*, *Phrygians*, and the *Athenians* themselves, that were not subject to *Worms*. The Testimony of these Authorities are not so great that we ought implicitly to believe, since there are very few, or scarce any Men who have not, or never had *Worms* but if any one affirms, I shall not much oppose him. But if I grant this of *round* and *common Worms*, the *broad* have nothing common with them, under that Name, since among many Thousands, one or another that is tormented with these in many Countries, perhaps, never saw a *broad Worm*. And this might so happen, if his Plague should necessarily have descended from Parents to their Children, as a kind of unhappy Portion or Inheritance from the Beginning of the World. Therefore if the *broad Worms* for this Reason do not appear to be bred and there may be another Original of them, what may we suppose of the *round Worms*? I did not deny that *Worms* may sometimes breed in Man, and also with Man, in like manner as those in Infants before they are born, as the Observations of *Hippocrates*, and the most eminent Moderns evince. Sometimes, I say, this may happen, namely from those Insects that are so injurious in the Mother's Womb but not in other Men, many whereof are not disturbed thro' the Course of their Life with the *broad*

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Worms. If the greatest part of Mankind are favour'd
with this Privilege, whence came it, or for what
reason, that this *Disease* was first communicated to
a few unhappy Wretches, and is still continu'd?
The Stress of the Argument turns here, this is the
greatest Difficulty, and we seem to labour in vain
to hand down this Succession of Worms from the
first Ages to this Time, since we cannot understand
why, among so many Millions, so few are troubled
with these Worms. What then? In the next place
we ought to reflect, whether this Creation of Worms
was to our Prejudice, or establish'd for some other
Ends? If this looks absurd, perhaps it cannot ap-
pear less absurd, if we suppose all those Worms re-
ceiv'd from our first Parents, remitted their Punish-
ment to future Generations; nay, there are part of
them that are never seen but in some particular Cli-
mates and Countries. So the *Vena Medinensis*, a
Worm commonly troublesom among the *Arabians*,
Africans, and *Indians*, is never felt by other People
who live in colder Climes; as on the other hand,
the *Tenia*, at least that of the first Kind, is common
in moist and cold Countries, while those who live
in warmer Regions perhaps never see them, which
could scarcely happen, if both these *Species* of Worms
had been, with all the rest, bred or created from the
common Parent of all Men.

I cannot see what can be gather'd from hence,
unless he had said that the *Seeds* or *Eggs* of Worms,
or other Insects, troublesom to Mankind, received
from the first common Parent, could lie long hid in
the Body of every single Man, and there, sometimes,
as Occasion serv'd, be rais'd up or excluded as there
should be Need thereof. So in that old Man, of
which Mention has been often made, the *Eggs* of the
Tenia or *Tape-worm* were not excluded 'till the *fifty*
Year of his Age; because the Place before, as
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it was even, was not disposed; or because the Jeces of the Guts were perhaps never before of a Quality requisite to promote the Discharge of the Worms; except we should say, that he was ignorant otherwise how these Worms excreted, which cannot be done. But those which were voided the slowest in that Man, in another should be done much sooner; and that before he was born, or in his Childhood, or Youth, as a proper Occasion soon or later offer'd; but they are never mov'd or rais'd out of their Beds in many, because there never yet happen'd a Disposition or Conveniency of Humour and Place, that was apt and proper to excite them to move. So also, the Eggs of the *Vena Medinen* or *Vein-worm*, that I may insist upon an Example ready allow'd; altho' they can be hid in the Skin or Flesh, or really are so hid, yet that *Insect* will be troublefom to the *Africans*, *Indians*, and *Arabs*, and yet not dreaded by the *Dutch*; because these Eggs can be easily voided or discharg'd by the Heat of *Africa* or *India*, but in *Holland* the same Eggs cannot be excluded by reason of Cold; whereas, on the contrary, the *Dutch* are plagu'd with the *Tan* their Eggs being render'd fruitful by the Humidity of the Climate; whereas, thro' too much Drinking in the Countries of *Arabia* or *India*, they remain barren; and so of the rest. This Opinion is confirm'd by the Observation of *Hemmersamius*, who speaking of the *Vena Medinenfis*, the *Blood-worm*, *Vein-worm* or *Guinea-worm*, he says, 'Tis worthy Notice that whoever sails by the Coast of *Guinea*, feels a pricking or itching in his Skin, especially in the Arms and Legs, but most frequently in the Thigh. Certainly, this *Itching* seems to indicate an incipient Motion of that *Worm* stir'd up from the Heat of that Climate: Every body must know what Heat and the Fermentation of Juices are capable of doing towards the

towards the Exclusion of Eggs. Neither ought the
apparent Inutility of so many useless or sterile Seeds
prevail, since the same may be said of many other
seeds, the greatest part of which is often lost, and
the throwing away thereof ought to be valu'd as
nothing, if we have Regard to the inexhaustible in-
finite Number of them all. Neither, lastly, ought
the long Delay of these Eggs in the Body, before
they be voided, be any Objection; whereas the
seeds of several Plants are kept many Years, and
afterwards thrown into the Ground, where they
grow afresh. And the long lodging of the Eggs in
Women sometimes before they are fecundated, is
another Example, but no Objection: The same Rea-
son is assign'd for Lice as Worms; for the Eggs of
those may lie lurking in the Skin of Man's Body, e-
specially the Head; but then they are cast off, since
they contract a Stench and Foulness from the Excre-
ments of the Skin, by the help of which, serving
them as it were for a Ferment; whereby, if the
Head is kept clean and well comb'd, there is always
a way open to discharge them from the Body.

BUT if this be admitted, and further enquir'd
into, when and how those Seeds first of all were uni-
ted to the human Body, and distributed in single
parts; the Answer will be, to the Seed of that very
Man, or the Egg from which the first Man was ex-
tended, or Worms, or other Insects, which were
lock'd up in these Ovaries from the Beginning; so
that the Residence of some VVorms ought to be in
the Intestines of Men, their Eggs being plac'd there;
others are fix'd in the Fluids of the Body, the Flesh,
Skin, and every other Part, as the VVorms belong-
ing to each have their Habitations. Neither will
this seem so impossible, first, if we consider the whole
Plant is contain'd in the Seed of the Plant; so the
whole Animal is contain'd in the Egg of that Ani-
mal,

mal, or all the Parts thereof contain'd therein; in the next place, if the Opinion of those is not refut'd us, among whom is *Malbranch*, who are perswaded the whole future Race of Mankind was in a wonderful manner contracted, and might lodge or be contain'd in the *Ovary* of the first Woman. If this Place so strait cou'd contain infinite Millions of Men, their *Worms* also might easily be added to every distinct or single *Homunculus*: Neither is the Case more difficult as to *Worms* in other Animals; nay *Worms* will accidentally or otherwise stick to the first Seed of Plants, and afterwards eating up the very Part thereof, as if the Destruction of Life from certain Principles had been inherent in the Composition of all living Creatures from the Beginning, or else for other Reasons unknown to us. Besides, we may enquire whether the Bodies of *Men* and *Worms*, confin'd in such narrow Bounds, can, by the bare Law of Motion, appointed by the Creator in the Beginning of all things, afterwards set themselves at liberty in their own stated Time, according to the Course of Nature; or rather whether God is the immediate Author of that Motion or Manifestation of extending and setting them free. Both Opinions may be defended, but we have no Business to determine any thing upon this Argument.

A few Months before this was writ, the learned *Vallisnerius* oblig'd me again with a new Piece call'd *New Observations and Experiments upon the Eggs of Worms found in humane Bodies*, printed in Italian 1713 wherein he proposes a new Argument against his own *Hypothesis*, which defends the Creation of *Worms* in our first Parents, which is here refuted. ' Those ' Worms in the Bowels of *Adam* were form'd by ' God, either before his Transgression or afterwards ' and if we consider that first Man innocent as he ' was created, it is not reasonable to suppose, that ' God

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God would have placed the first *Worm* in his Body; forasmuch as Man in this State of Innocence was to be free from all kind of Diseases, in a perfect State of Happiness, disturb'd with no Uneasiness of Body; but the matter would have prov'd otherwise, if *Worms* had lodg'd in his Bowels; for *Worms*, as we find by Experience, introduce a Train of Diseases, and often Death. Nor is it easy to understand that he who was disturb'd with the filthiest kind of Insect, made up of Putrefaction, could enjoy the sweetest and most delightful kind of Life, conducted by the pure Light of natural Reason, when that Man's Desires were hurried away after inordinate eating and drinking such things from which that putrid Humour comes that contains and nourishes the Eggs of *Worms*: And then God had in vain foreseen by his divine Prescience the Consequence of *Adam's* Transgression. It may be also difficult to explain how that *Worm* could fecundate the Ovary of the Woman, and how the same *Worm* disseminated its Eggs thro' all the Parts of *Adam's* Body, that, that very Rib, from which our first Mother was form'd, was Partaker of them; so that these filthy Creatures are received by the Infants from their Mother's Womb, and we have them necessarily, as it were, by hereditary Right, according to *Vallisnerius*, &c. But if on the other part, after the lapsed State of *Adam*, we allow that *Worms* were form'd by God in the inward Parts of the Body, a greater Difficulty will still arise; for hence it will follow, that God made a new Creation of *Worms*, which is contrary to *Holy Writ*; since God hath taught us, that before Man was made, all other Animals, Insects themselves unexcepted, were created. Therefore *Worms* could not be created in the Body of *Adam*, either before or after his Fall.

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VALLISNERIUS answers thus, ' Before
 ' Man, the rest of the animal World, Plants, and
 ' whatever else we behold, were created by the Al-
 ' mighty, and Man at last was form'd out of the
 ' Dust of the Earth. But when the *Worms* which
 ' were created before in this Earth, and there set-
 ' tled, part of them, to wit those whom God ap-
 ' pointed to Man, while he preserv'd himself in his
 ' first State of Innocence, were to be useful to him,
 ' and render his Body more perfect; and if after-
 ' wards he should sin, to be a Punishment to him,
 ' and enter into the Fabrick of his Body. Nor
 ' ought it to seem strange, if to the Perfection and
 ' Advantage of the human Body in this Beginning of
 ' all things, *Worms* may be said to contribute any
 ' thing.

' For as there is a certain mechanical Composi-
 ' tion call'd an *Automaton*, or several Machines,
 ' whose Make and Structure is finer and more ad-
 ' mirable than the rest, and that perfect thing is
 ' call'd a World, which hath therein different Ani-
 ' mals of all Kinds, great or small, noble or ig-
 ' noble; but there is likewise a certain desert Coun-
 ' try in it; is not this reckon'd unfit for Inhabitants,
 ' and post-pon'd to the rest? Why therefore may
 ' not this little World, for so the Body is call'd,
 ' which is endow'd with as large Privileges, want
 ' Inhabitants too? It will not therefore be so inju-
 ' rious to the first Parent to say, that his Body might
 ' have been an Hospital of various and wonderful
 ' Kinds of *Insects*, which while he was innocent,
 ' ought not to contribute to his Destruction, but
 ' make him more compleat, and yield him Honour.
 ' Notwithstanding *Adam* could support and feed
 ' those *Insects* which had a mind to live together
 ' quietly and friendly, as we may say; and if any
 ' thing superfluous remain'd, that they might eat,

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but they cou'd abstain from Food, and would not transgress their Bounds, or eat Holes thro' the Sides of the Guts, which was their Habitation, but they would rather, by gently licking the Parts, and by healing them, do their Host a kindly Office; nay, if the Fibres of the *Viscera* grew weak or unactive, or sometimes were oppress'd with too much Excrement, these wou'd kindly give Assistance to all their Wants; in a word, instead of being burthensome, they were of the greatest Advantage to Man. But this Happiness of *Adam* was but of a short Continuance, for disobeying God, who had loaded him with so many Blessings; all things were suddenly chang'd; so that these *Worms* were made the Ministers of Divine Justice, and rais'd an Insurrection upon him; and as there was Liberty given to *Serpents* to hurt by their Poison, and the *Lion* and *Leopard* with their Paws; so the *Worms*, tho' Inhabitants of the human Body, had Leave given to destroy, and become a common Enemy to Mankind.

WHAT relates to the Rib taken from *Adam*, *Vallisnerius* answers, ' That in this History, meaning the Bible, I suppose, many things occur which are beyond the reach of human Understanding, or where the Sense is hid from us; but if a Narration may be taken according to the Word, perhaps the way may be found out, whereby the *Worms* might pass from the Inwards of *Adam* to the Rib, out of which *Eve* was form'd, to wit, the *Thoracic Duct*, which communicates some Branches to the Ribs, and from thence to the *Intestines*, which is the Place of their Nativity. Neither had it been more difficult to God, who made Man of the *Earth*, to have introduc'd *Worms* brought out of his Bowels into a Rib of the same, as have made a Woman's Body out of

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the Rib of a Man, and yet the Number less compleat.

THE Opinion of *Vallisnerius* may indeed seem to be paradoxical, so far as he has made it as it were a Duty in the *Worms* to lie latent in the Body of *Adam*. But allowing the thing to be uncertain, it will be enough for that ingenious Man, since the Question is only concerning a bare Possibility, if it cannot be deny'd but that it is at least possible, and for that reason he hath brought his Argument from Scripture: One thing only may be objected; it had been easy for that accurate Author to have assign'd Uses for the *Teretes* and *Ascarides*, the most common of all, in the Body of *Adam*, but in the meantime what would he have done with all the rest; as with the *Lice*, for Example, whose Antiquity is equal to the best of 'em? Whether *Lice* were useful to *Adam* in the State of Innocence? These indeed in some *Diseases*, are prescrib'd by Physicians, as the *Yellow Jaundice*; so that they may be serviceable to the *Sick*, but they seem no ways useful, but rather troublesome to those who are in *Health*. By what means then can we demonstrate that those were agreeable to *Adam*, since at this Day they are of no use to sound Persons, if they are only bred in uncomb'd Heads, and filthy dirty Skins? It may be answer'd, that there are many things which seem to us offensive and nasty, which appear'd to innocent *Adam* under another *Species*, and affected him differently. And from hence the *Lice* which we now seem to have such an Abhorrence of, might be no way troublesome to the first Man, but, on the contrary, might be very serviceable to him, in gently opening the Pores of the Skin, or doing some other good Offices; and the Reason might be the same for the rest of the *Insects* that dwell on human Bodies, since their Uses are not easily known to us. But per-

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haps we may remove this Difficulty laid in our way by the Reverend Father *D. Ant. M. Borromeo*, by attending a little to *Vallisnerius's Hypothesis*, viz. that the Eggs of all those *Worms* or Insects breeding in the Body of Man, were created in the Body of *Adam*; nor were they excluded before his *Transgression*.

BUT passing by these subtile Disputations, which seem foreign to our Design, it may be enquir'd among Physicians, Whether *Worms*, at this day, can be any ways serviceable to Children? Or whether the same which have been from the Beginning, as *Vallisnerius* says, can now be useful, as consider'd with some Inconveniences? But before we determine any thing upon this Matter, it will be proper to look about us, and enquire into some things concerning the Nature, State, and Temperature of other extraneous *Insects*, that making a Comparison among the various Kinds of them, we may see whether we can give any better Light to our Argument. There want not those who condemn all *Insects*, at least, who think them superfluous; or if there are a few that are of use, that is so small, they look upon the whole Bulk of 'em, as if they had better never have existed. But, far be it from us, that we should believe the Works of God imperfect, or evil, like that King of *Castile*, who said foolishly and impiously, *If God had advised well in the Beginning of the human Creation, many things had been better than they were*. None but a mad Man will affirm that the all-wise God made all living things on Earth to exist without any Necessity; altho' no Man knows wherein this Necessity consists, since they were done by the wise Author of all things, it follows they were necessary, as we are taught in his *holy Word*. Nay, if we consider the Number of those Insects, of which more hereafter; the exquisite Fabrick of each

of them, with their Minuteness, next to Atoms themselves, together with their various Changes, Forms, Colours, and exquisite *Genius*, we cannot but must acknowledge the moving Hand of the great Artificer; and as these are infinite in Number and Variety, so are they in their Uses. And of those we know, first of all, the *Bee*, which, for the Advantage she produces, is almost equal to that of the largest Animal; and one thing more remarkable, she costs her Owners nothing for her Keeping. The next are *small VVorms* contain'd in the *Berry Kermes*, from whence they press a purple Juice of an exquisite Taste, and is esteem'd a good Restorative and Cordial in Medicine: Besides this, it is very useful in *Dying*; but is now much excell'd by the *Cochineal*, (which our Author erroneously supposes to be an *Insect*, but is a *Fruit* or *Berry*, as may be seen in the *History of Drugs*, done from *Lemery* and *Pomet*.) To these we may add the *Silk-VVorm*, an *Insect* of vast Use and Advantage to all the poor Inhabitants of the warmer Parts of *Europe*, particularly, where this laborious Creature maintains more by its Industry, than all the Hospitals of that Part of the World, which are generally rais'd from *Pennyury*, *Fraud*, or *Usury*.

FROM *Insects* it is we have *Remedies* in most *Diseases*, and *Food* that is grateful to the *Palate* in most *Countries*, as *Honey*, *Locusts*, *Eels*, *Snails*, *Frogs*, *Vipers*, *Snakes*, *Cantharides*, *Millepedes*, &c. I pass by a Thousand *Insects*, that have singular *Qualities*, both as to *Food* and *Physick*; because it would be endless, as well as foreign to this *Design*, to enumerate them. The celebrated *Mr. Ray*, in his Book call'd, *The Wisdom and Existence of God manifested in the Works of his Creation*, sets forth, at large, the great Use and Benefit of *Insects* to *Mankind*. But we may see, besides a general Use or End, in re-

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gard to the rest of God's Works, a more particular or special Intention, if we will but observe what vast Advantage they have been of to our modern Anatomists, that they might arrive at a clearer understanding of the Parts of the Bodies of larger and more perfect Animals, viz. by a Comparison made betwixt the Parts of each of them, and their Structure, for which we are indebted to the illustrious *Malpighius*. But besides the Benefits accruing to Man, divine Providence may propose various other Ends to herself, since she produced them out of nothing; and the chief Causes of their Creation may be still a Secret to us. This will appear the more likely; first, if we look upon the Number of them, not so as to regard the single *Individuals* of every *Species*; but what is principally worth Notice, and very wonderful, is, if we attempt to compute their *Species*; *Ray* says there are above *Twenty Thousand*; but their Number must be much larger, if only in a single *Oak Tree*, more than two Hundred several *Sorts* have been discovered, as *Vallisnerius* affirms, in his new *Idea of a general Division of Insects*, written in *Italian*. Besides, this very single *Plant* hath its *Insects* adhering sometimes more or less, all which are different among themselves, which is a Check to the Presumption of our modern Philosophers. What if to these we add many others, and those not any ways alike in their kinds, that are in the *Air*, *Sea*, *Rivers*, *Springs*, *Lakes*, *Ponds*, *Stones*, *Marble*, and lastly among *Men*, *Birds*, and *Beasts*. And let us consider distinctly their Smallness, which eludes the finest Sight, and is not visible without the *Microscope*, besides others, perhaps so minute, that they are not discernable by any such Instrument. I say, if we consider these things, who can hope ever to arrive at the Knowledge and View of this minute indeterminate Multitude? But those things

which we can neither see nor know, are nothing to us, except they act upon us unknowingly, which we cannot say of many *Insects* which never touch our Bodies; all things therefore do not appear to be done from a Cause, except, as before observ'd, they manifest the Wisdom and Power of the Creator. The Providence of God hath provided various Foods for various *Insects*, *Worms*, or *Reptiles*, which the *Psalmist* says are innumerable; and this is done according to the different Nature of each Kind; so some seek their Substenance from the Dew of Heaven, the Leaves and Flowers of Plants &c. as the *Grasshopper*, the *Bee* &c. Others take their Aliment from Plants or Parts thereof, in which they deposite their *Eggs*, and from which afterwards their *Worms* or *Young* are brought forth: But these are numberless, and adhere to some Plant, or the Parts thereof, as the Bark, Leaves, Flowers, Fruit, Seed, and that every Insect proper to its kind: Others again feed upon Water, Earth, or the Juices therein contained; some upon Stone, others again upon living Creatures: some fly upon the *Hides* or *Skins* of larger Animals, whereon they rest, build their Nests, and lay their Eggs, whence in due Course of time they bring forth their Young, and there maintain the Brood. Others introduce themselves into the Nostrils, and other Cavities of *Animals*; lastly, there are a *Species* that enter the *Viscera*, lay their *Eggs* and hatch there, neither will they breed or be nourish'd in any other Place. Therefore there are various ways of living, and Diet for all Sorts, as Nature has provided; for some are *Eaters* of *Plants*, *Fruits*, and *Flowers*, others of *Flesh* of *Animals*, or the Juice of them, and therein breed and are sustain'd.

For the Conservation of the *Species* seems to be the first Care of Providence, in the Perpetuity of which

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which we have an invincible Argument of all things being of the first Creation: But that their Kinds might be preserved, especially that of *Insects*, it appear'd necessary that the *Seeds* or *Eggs* of them might be multiply'd to an infinite Number, as hath been observ'd, lest all should be lost or destroy'd by Cold, Rain, or some external Injury; secondly that the Offspring of *Worms* produced from these Eggs, might be so numerous, that the whole might never perish from the Inclemency of Air, or any Accidents from Men or other Animals, but avoiding all Casualties there might still be sufficient to propagate their kind.

BUT that I may now solely treat of *Insects*, altho' such is their Smallness and Infirmary that it is hard to escape so many imminent Misfortunes, yet they are not all so weak and unable, but they can sometimes hurt the largest and strongest Animals. There are some of these *Insects* that outwardly pinch and bite the Skin or Flesh of Animals, or naturally dig Holes in certain Parts of the Body, where they live and breed. Of the first Kind, which give the most grievous Pain, and cause Death it self; are *Vipers*, *Scorpions*, *Tarantula*, and other venomous Creatures. There are others which procure Pain, but not so dangerous, as *Bees*, *Wasps*, *Gnats*, *Horse-flies* &c. and some bite the Skin, and suck the Blood, but are not so obnoxious as the others; as *Fleas* *Lice*, &c. whose Wounds are not so deep and venomous, and therefore are more tolerable, so that they can be borne even by Infants. The second Sort are those which come from the Eggs of a certain Fly, which, in time, come to be *Worms*, and are deposited in the Nostrils of *Sheep*, *Deer*, and other Creatures. There remains a third, to wit, those which inhabit the *Bowels* of Men and Beasts, owning no other Country, and these are *Worms* upon which Subject I have made this long Digression.

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WHEREAS Providence hath made it necessary for these and all other *Insects* to provide Aliment and Juice, and none can do it in any other Place, than where they have their Dwelling, we can't deny the *Viscera* to be the proper Mansion for these kind of *Worms*; but the Question is, Whether they can live there without Mischief, or whether they are necessary or hurtful? The last is vulgarly affirm'd, but that upon such bad Grounds, that what is agreed upon by the Generality, is most commonly founded upon Ignorance or Mistake. If by chance, a single *Worm* is voided in the Stool of a sick Person, strait they cry out, Here's the Foundation of the Calamity, see the very Cause of the *Disease*; as if nothing else cou'd procure his Illness from the Corruption of Humours, or a deprav'd Disposition of the Parts. Some few *Worms* may, indeed, sometimes do hurt, but they are not always hurtful; but a great Number of them may sometimes be contained in the Excrement of Children, without any troublefom Symptom arising from thence: As the History related by me, *Chap. X.* makes good, and may be confirm'd by others, of the like Nature, extant among Authors. *Verminous*, or worm-eaten Fruit, frequently perish or fall off unripe; but Men subject to *Worms*, in Infancy or Youth, Experience shews, are not so liable to decay; but the Cause of this Difference cannot be taken otherwise, except from the Difference among *Worms* that breed in the Bowels of Men, and those which eat the *Apples*; these last, because of their *Kind*, which is to devour Fruit, we call hurtful; but the others may be termed innocent, from only feeding on the superfluous Juices in the *Guts*, as hath been observ'd elsewhere. God Almighty pitying the Misery of Mankind, hath bestowed upon us many *Remedies*, not only against this Plague, but also all other *Diseases*, which

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we cure, or at least palliate thereby; so that we prevent the *Ills* that threaten us frequently, by either expelling them from the Body, or destroying them in the same. I am of opinion, that sometimes we have no need of Medicines against *VVorms*; but if there were scarce any Children, as some Physicians think, that were free from *VVorms*, we wou'd lay this down for certain, and from thence consider, that a great many of them rarely or never use Medicines at all, which do not for all this suffer by the want thereof; from whence it follows, Medicines are not always necessary. I know there are several Mothers of Families so solicitous for the Health of their Children, that they are for crowding Loads of Physick down 'em; but the far greater Number of Parents are not so anxious about this Affair, whose Posterity notwithstanding enjoy an equal State of Health. But when *VVorms* grow troublesom, so that they are distinguishable by their Signs, then the best Remedy for the Poor, is *Wormseed* or *Tansyseed*, which administred at first, will drive out these troublesom Guests. In the next place 'tis observable, that worm-eaten Fruit decays; because the *VVorms* being nourish'd by the Substance of the Fruit, by its feeding upon it, it sensibly wastes; but the *Worms* lodging in the *Bowels* of Animals can be plentifully subsisted from the Matter contain'd therein, so that the *Guts* themselves, should they want Food, wou'd not be liable to be eat or gnaw'd upon. But some will say, that they are noxious in their own Nature, in consuming the Moisture or Juices of the Body, design'd for the Support of the Master of the House, or Lord of that Tenement: But this Objection has been answer'd Chap. X, in the Question, Whether there are more *Tape-Worms* than one to be found in the *Intestines* of a Man. Some *Insects* gnaw asunder or devour the

the Roots of Plants, or their tender Branches, and undoubtedly destroy those Plants; but the Reason is different in those which subsist only upon the superfluous Juices of them. Among these I have reckon'd the *Bees* and *Grass-hoppers*; but beside these larger *Insects*, there are innumerable lesser ones, which, from too great Plenty of Juice after modern Rains, draw the necessary Part of their Aliment from the Fibres of the Roots; with these and the like we may compare our *Worms*, and these not a great deal differing from the *Earth-worms*, as to this Particular; for they take their Food either from the Earth it self, or the Juices contain'd therein, and seem to abstain from the neighbouring Plants, which renders them intirely inoffensive.

And we have demonstrated from Experience, that that very long horrible *Tape-worm* is not so dangerous or frightful, but on the contrary that it has lived several Years in the human Intestines without any manifest Inconvenience. But if we can entertain such a *Worm* as this without Hurt; surely one that is less may lie quiet, and undisturbed. But the *Gourd-worms* usually found in *Sheep's Livers*, of which we have spoke before, are not so innocent but on the contrary are very hurtful to all sorts of Cattel, as the *Butchers* can testifie; and as we have observ'd from *Bidloo*, Chap. VI. it happens indeed sometimes that the *Liver* is lacerated from the same *Worms*, as from the *Teretes* the *Guts* are perforated but this rarely happens, nor will it serve to oppose the Argument defended by me; for I have not undertaken to prove that *Worms* are never hurtful, but that they are not always so.

But it is not enough to prove the *Worms* of the *Guts* are not hurtful, but that they are profitable or necessary, which in the next Place will be a difficult thing for us to persuade the *Haters* of *Insects*

into

into a Belief of. But if the explain'd Opinion of *Valisnerius*, already mention'd, be probable, concerning the Use of *Worms* in *Adam's* Body; it will not be thought highly improbable to suppose they are as serviceable now to Children, as they were from the Beginning to *Adam*. Nay, they will appear more useful at this Day, if we consider that Children are always gorging their Stomachs with Victuals, of which there is greater Necessity to discharge the Superfluity, than ever there could be in temperate *Adam*. Neither will the Pulsation mention'd of the sluggish Fibres be less necessary, so that whether the Conjecture of the Ingenious be true or false, of the Usefulness of the *Worms* of our first Parent, before he sinn'd, they may still be useful to Children at this Day; for certainly *Worms* are much more common in Infants and all young Animals, than in Adults or grown ones: Nay, the greatest Part of Adults may be almost said to be free of *Worms*; from whence it follows, they may be said to be peculiar to *Youth*, and not to *Age*. But *Worms* seem to be the particular Property of Children and Infants, for no other Reason, but because they are more necessary to them, than to People in Years; or Infants to whom the Nurse gives the Breast as often as it cries, cannot but be overcharg'd with Aliment, and Children, according to the Strength of their Appetite, will inconsiderately eat a greater Quantity of any thing they like, than is convenient or proper. Hence it happens, that in new-born Children the nervous Fibres of the Guts are too moist and not tense enough, or are not sufficiently open'd, so as to afford a free Passage for the Spirits, which being perhaps acted by the gentle Pulsations of the *Worms*, as it were so many stimulating Bodies, they might more easily open, move, and be contracted. If this is admitted, *Worms* will appear to

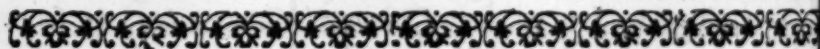
to be the best adapted for the Business, which *Hippocrates* long since, and other Physicians after him have observed in the very *Fœtus* not yet taken from the Mother's Womb.

I do not deny but that *Worms* are hurtful sometimes, nay, I confess that the Mischief they do is more evident than the good, which comes from the Consumption of the redundant Juices, attributed to them by me and *Vallisnerius*; but if so that as the *αλφρυία* of Children, so that the Consumption cannot be deny'd, since *Worms* are commonly esteem'd voracious, and no Advantage arising from this easing of the Burthen, as much as it did not shew it self so manifestly in express Signs, it ought to be call'd in Question. Also the Use taken from the Commotion of the sluggish Fibres is obscure, yet it is probable, if we will regard the Motion of these *Insects*, and their frequent Prickings: Yet such is our Ignorance, that how clear and evident soever they may appear to us, we cannot understand their Uses; and hence it comes, that perceiving and thinking amiss of these *Insects*, we imagine the Ill they do to be much greater than any Advantage we can reap from them, nay, we think not of those Benefits at all. But to see, lest this forejudg'd Opinion lead us into an Error; indeed there are an Infinity of other Things, some of which exist without us, and some within us, which sometimes hurt us, and otherwise often do us good. As for Example, the *Bile* or *Gall*, no body will urge but in its own Nature it is useful in the regular OEconomy of the Body, but that either in too great Quantities or alter'd in Quality, what Confusion and Disturbance it makes? The same Reason may be given of *Worms*; these, if they are small in Number, and quiet, are profitable; but if large, long, and many of them, most pernicious. But beside the Use

now declared, there are many others yet unknown. It wou'd be wonderful what is affirmed of Worms by the Learned *James Vercelloni* in a *Dissertation of the Conglomerate Glands of the OEsophagus or Gullet, of the true Digestive Humour, and of Worms*. Of all which, saith he, the *Thyroide Gland* is the Ovary to communicate a certain vital Principle to the Chyle. But that common Origine of *Worms* ought to be founded upon many Experiments, before it be admitted. But the rest in relation to its Use, in making or preparing Chyle that it may be convenient to Man, that is, be vital and nutritious; these Things, I say, appear to me very obscure.

If these things appear to be Paradoxes, much less can those be admitted which I have said, of all the *Worms* which shall be, being contain'd in the Ovary of the first Woman, nay, they may be taken for absurd by many, that may appear probable to some Naturalists. What then? if we should explode every thing that hath already been proposed about the Origine of *Worms* with *Dr. Tyson*, it would shock the singular Structure of the *Broad-worm*; whence we have thought new reasons might have been brought, by which *Univocal Generation*, is supported, and so well defended by *Rhedi* and others, that will overthrow every thing, at least as to that *Worm*. Thus while the Arguments subsist, that it cannot be demonstrated that any thing can be bred or generated from Mud and Corruption, we have been saying nothing. What therefore is the Original of the solitary *Worms* found in the human *Viscera*, if they cannot breed or be produced from a putrid Matter, as the Ancients and of late *Tyson* would have; if their Seeds cannot be had from the Air, Water, Food, or other Things and Places common among Men; If at length they appear not among Men, or otherwise, yet we will defend that they

they are generated; or this being allow'd, how they are communicated from one Man to another we cannot trace. The celebrated *Rhedi*, the indefatigable Asserter of univocal Generation, being perplexed with these undoubtedly, or the like Difficulties, since this kind of Animals is bred among other living Creatures, seems at last to have despair'd that he was never able to demonstrate how or for what Reason they were procreated. Thus far I have attempted concerning the Origine of *Worms*. But since from the Propositions of the Learned, on this Affair, there are evidently many false Opinions, and the Notion of those who think our *Worms* were created in Man, and with Man and in the *Ovary* of the first Woman; altho' this does not want its Difficulties, it may appear more probable than the rest, and either ought to be admitted, or, what is rather better, we will determine nothing in so obscure a Matter: As to my own Part, I shall not burthen my self with this, which I am ignorant of so many other things.



CHAP. XV.

Of Medicines which expel WORMS.

WE are come at last to treat of the Medicines, by the Help of which these troublesome Guests of the Intestines are discharg'd: Among these are such as are Enemies to *Worms*, as appears from the Force of Argument and Reason; and there are others which act by a certain Specific

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Virtue so call'd, that is, which does not appear manifest to us from Reason; altho' they are done in Effect, agreeable to Experience; there are also those which only serve to kill, or destroy certain kinds of *Worms*; and there are which expel and kill all Sorts.

BUT of those which act by a manifest Virtue or Quality, the first which offer themselves are all oily Things; by these, Insects and all others of that Kind which are without the Body of Man are destroyed, because they shut up the *Trachea* or *Pores*, by which *Insects* draw Air, or else the *Foramina* or *Holes* of the Skin. And that great Man *Malpighius* hath observed and described these *Trachea* in *Silk-Worms*, and found that Oil by many Experiments is deadly to this kind of *Insect*, and some others, as may be seen at large in his Experiments on the *Silk-Worm*, which being foreign to this Work, I refer the curious Reader thereto. The celebrated *Rhedi* likewise try'd many Experiments of the like Nature, with *Oil Olive*, upon *Earth-worms*, *Flies*, *Wasps*, *Bees*, *Snails*, *Silk-worms*, *Palmer-worms* &c. So there are many Compound *Medicines* appropriated by Physicians for expelling *Worms*, such as are the Oil against Poisons, which used to be prepared in the great Duke of *Tuscany's* Laboratory, the Oil of *St. John's Wort* prepared by many Infusions.

A certain eminent Man observes that *Worms* anointed with these Oils don't die so soon; from whence, says he, it may easily be understood how useless their Labour is, who anoint the *Nostrils*, *Temples*, *Navel*, or other external Parts of Children with these Oils, in order to destroy the *Worms*. Besides these Oils, and Oil-olive, there are other Liquors distinguish'd by the Name of Oils, but which consist of Particles much stronger and more penetrating; so *Petroleum*, which kills not *Worms* by its

its oily Quality, but its *sulphureo-bituminous* saline Parts; which are very active; for they presently pierce the tender soft Bodies of those *Worms*, so that if you pour three or four Drops of this Oil upon one, two, or more of these *Worms*, they die instantly of Convulsions. Oils extracted by Fire are likewise prevalent, as Oil of *Amber*, Oil of *Juniper* from the *Wood* or *Berries* made by Distillation, so Oil of *Hazel* or *Filberts*, &c. And so of all Oils extracted from *Aromatick Woods* and Plants.

Common Salt infused in Water, Salt Gem and other kinds of Salts, as your natural or mineral Waters cold or hot, in which there is any fix'd Salt; *VVine*, *Brandy*, *Vinegar*, *Pepper*, &c. are all, by their pungent Qualities, Poison to *Worms*. I will here give you the Experiment of the ingenious *Rhedi*. Cast *Earth-worms* into spring Water, saturated with common Salt, and they will instantly die; nay, if you add more fresh Water, they will die in a short Time; but if you add three Parts more of fresh Water, they will die in the fourth Part of an Hour; if four Parts more, in two Hours. *Salt Gem*, *Vitriol*, *Allum*, *Nitre*, *common Salt*, are all good against *Worms*. Hence our Author concludes that the Mineral Waters all destroy *Worms*, and the cathartick or purging Kind educe or void them. The same Author also recommends *Volatile Salt* of *Vipers* and all other volatile Salts.

THE same *Rhedi* says, throw *Earth-worms* into *Brandy*, or *Spirit of VVine*, and they perish presently; they likewise die soon in *Wine*, white or red, or sweet *Wine*, and also *Vinegar*. The same Insects will expire in a quarter of an Hour, in an Infusion of *Pepper*; but they die sooner, if you throw the Powder of *Pepper*, or *Cinnamon*, or *Tobacco* upon them. They will continue

longer

longer alive in the Juice of *Acid Lemons*, than in that of *Sweet Lemons* or *Oranges*.

THE same Author proceeds: 'I have cast a large Quantity of Quick-silver into a glass Vessel full of common Water near boiling, which infus'd there twelve Hours: But the Water being cool'd, and the *Quick-silver* unmov'd, I threw in four *Worms*, which died there within twenty Hours. I cast into another glass Vessel as much Mercury or Quick-silver as would cover the Bottom; and to the Mercury I put the largest Worm, which presently was put in a violent Agitation, and began to throw off a great deal of Slime, but at last died stiff and convulsed in twenty-four Hours time.

Bitters, which are the most ingrateful to the Palates of most Men, are also so to *Worms*; but they chiefly destroy by their deterfive pungent Qualities. But the Reason is not the same in all *Bitters*; for some act slower and milder, according as they are more or less endowed with *Salts* and other *acrid Particles*, according to the following Trials of the said *Rhedi*, who took a Water made as bitter as the *Aloes succotrine* would make it. 'Into this Liquor, said he, I put four *Earth-worms*, which seem'd as it were suddenly surprized and benumb'd, yet they continued alive therein twenty four Hours, then one of them began to shoot his *Skin*, from the *Tail* to the middle of the *Back* and *Belly*, and the Place where the *Skin* was stript began to draw on Heaps, and to stick there like the Body of the Worm, wound up in a Circle or Ring. But twenty-four Hours being past, I took those *Worms* out of the bitter Water, and put 'em into a glass Vessel with moist Earth, in which I had mix'd some Powder of *Aloes*; they liv'd here many Days. I repeated the same, taking four other

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Worms, and put 'em into an Infusion of *Aloes* Water, in which they liv'd three intire Days, but on the fourth all died. Who therefore will believe *Aloes* such an Enemy and so deadly to *Worms* in Men, as hath been publish'd by the Writers of the *Materia Medica*? But if *Aloes*, which has such Bitterness in it, cannot do this, it is in vain to lay such Stress upon a *Cataplasm* or *Pultise* made from *Peach Tree* Leaves and Vinegar; also in the bitterest Decoction of *Lupines*, wherein I have thrown *Worms* and they have liv'd several Days; yet in a strong Decoction of *Worm-wood* I own I have found the *Worms* dead in twenty-four or thirty Hours at most: But they perish much sooner being thrown into Water wherein *Coloquintida Apples* have been infus'd, for there they die in fourteen Hours: And add to the former Infusion fresh Water, and after twenty-four Hours cast in other *Worms*, they will all die in a little Time. But *Worms* were kill'd in a shorter Time, to wit, in seven or eight Hours in Water wherein *Wormseed* had been infused; likewise wherein *Sena* and *Rubarb* have been steep'd, that also kill'd these *Worms* in fifteen or twenty Hours, according to the Quantity of Water in which the Drugs were extracted. The *American Bark* likewise kill'd several *Worms* that were infused in a Tincture thereof forty six Hours.

FROM these Experiments of the sagacious *Rhedi* that all *Bitters* are not destructive of *Worms*; nay we ought not to ascribe the Death of the *Worm* only to the Bitterness of the *Simples* now mentioned, tho' all of them are more or less so, where as *Aloes*, almost the bitterest of all, seems but lightly to hurt these *Insects*; but *Wormseed*, tho' a less Bitter than *Aloes*, kills 'em in a short Time. We may indeed suspect that *Seed* does not do it so much

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from its *Bitterness* as its Odour, and some acrid *Effluvia* issuing from it that destroys the *Worms*. But *Worm-wood* not as it is a less Bitter, but as it smells strongly, acts upon the *Worms*; yet as *Rhedi* says, this is very slow and gently. Nay, I have learned that the *coarse* or *hairy Trefoil* almost without any Smell, but yet is very bitter, destroys the *Earth-worms* sooner than *Worm-seed* or *Worm-wood*; and this from repeated Trials. Having made a strong Decoction of this Herb dry'd, I cast into it several of those *Worms*, which in two, three, or four Hours at most, after they had been agitated with violent convulsive Motions, and their Skins were stript off, they all died. The *Enula Campana* Root indeed is very odorous, but its Bitterness seems to exceed it much; yet casting in some live *Worms* into a Decoction thereof, I found them dead in four or five Hours, and almost naked, or without Skins. Therefore those *Bitters* act the most powerfully upon the *Worms*: Yet I must confess in some other *Bitters* almost without Smell, I have not met with the like Quality. We see what *Rhedi* says of his Trial on *Aloes*; neither does the *lesser Centaury* greater Feats, tho' it is an intense Bitter, and call'd by some the very *Gall* of the *Earth*: For immersing *Worms* in a Decoction of the Plant, after three Days were over, I found 'em alive, tho' they had been almost robb'd of their Skins; which is the same *Rhedi* observ'd to happen in his Infusion of *Aloes*.

BUT if that be the Difference of *Bitters*, so call'd among themselves, they are not a little different among themselves, which affect the Nose with their Odour, whether join'd to more or less Bitterness. We have done with *Wormwood* and *Wormseed*, which are of this Kind. Among other smelling and bitter Plants, *Mint* hath been highly

recommended against *Worms*, by *Dioscorides*, and other ancient Authors; whence *Schola Salernitana* says,

*Mentitur Mentha, si sit depellere lenta
Ventris lumbricos, stomachi vermesque nocivos.*

This I have try'd will kill *Ground-Worms*, if they are immers'd in a Decoction thereof, for about 20 Hours; so that the Virtues of it may be rank'd with that of *Wormwood*. I used the dry'd Leaves of *Mint* gather'd about *Autumn*, when the Virtue of the green Leaf is much stronger. I have also try'd the dry'd Leaves of *Southernwood* Male and Female; the Effects whereof were much the same; nor was there a great Disparity in the Action of *Camomil Flowers*. But a Decoction of Herbs of the same sort, the strongest of which are *Tansy*, *white Horehound*, and *Motherwort*, will kill *Worms*, betwixt five and six Hours Space, that are quite stript of their Skins. Neither is the Virtue of *Rue* different, to wit, the Decoction, which kill'd *Worms* in the same time; but this may seem strange, that a Decoction of *Rue* should have so little *Bitterness* in it, or scarcely afford a Scent, when the Herb it self is so foetid; but this must arise from the sulphureous Particles, which are easily evaporated in boiling; as we find there is little Smell in the dry'd Herb, which makes *Tansy*, *white Horehound*, and *Motherwort* differ much from it, because they retain their Odour. *Scordium*, if dry'd, presently loses its Scent, nor will a Decoction of it kill *Worms*, altho' it will flea their Skins off. But I did believe that the Leaves of *Savine* was the most powerful in this Case, since it was so fix'd that the Odour of it was not easily dissipated, and it had an intense *Bitterness*; but trying some *Worms* in a Decoction of the Plant lightly bruised, they liv'd almost 12 Hours therein.

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THE *Decoction* or *Liquor of Coffee*, that is of such general Use, and esteem'd both for its *Bitterness* and *Flavour*, I try'd, by putting in some *Worms*, which dy'd in 24 Hours, with the *Skins* stript off, the whole Body soft and *flaccid*. For the Use and Affinity of it, I try'd an Infusion of *Tea*, in which, when the *Worms* were thrown, they dy'd within 15 and 18 Hours time; but not without their *Skins*, as the former; but so deterg'd and cleans'd, that they appear'd without any thing shining about them, as if they had been dy'd of an *Amethyst* Colour; neither were they, as the rest, *flaccid* and soft, but hard; whence it follow'd that it was the Astringency of the Herb which gave it that detergative Quality, which constip'd and clos'd the *Trachea* of the *Worms*, whereby they perish'd for want of Air. The *Decoction* of *Fœnugreek* hath also a strong *Bitterness* and *Odour*, in which *Worms* will die in 18 Hours time, and be dissolv'd.

R H E D I mentioning *Garlick*, says, its Taste is very sharp and biting, rather inclining to an *Acid* than a *Bitter*, and the Smell of it is the worst Plague of the Nostrils. I immers'd also some *Worms* in the *Decoctions* of the Roots of *Bistort* and *Tormen-til*, first pounded and strain'd; in this they perish'd in the Space of 24 and 30 Hours, and appear'd hard, which I ascribe to the astringent Quality of those Roots.

WHY *Worms* are kill'd by *oily*, *salt*, *acrid*, *acid*, *astringent* things, seems to me easy to be understood, if we regard the pungent eating or corroding Quality of those *acrid* and *saline* Bodies, which the tender *Insects* are not able to resist; but it seems at first strange, why *Sweets* shou'd sooner kill than all those *Bitters*, &c. such as *Honey*, *Sugar*, the express'd Juices of *Grapes*, and other *sweet Fruit*. 'I dissolv'd, saith *Rhedi*, *Spanish Honey* in a little Water, where-

in I put four *Worms*, and saw them all dead in the third part of an Hour, and I repeated the same Experiment, and it was always attended with the same Success, or very little Variation. Therefore that common Opinion is false, tho' receiv'd for the most certain Truth of all, that sweet things would never kill *Worms*, but rather feed and increase them, and they believed most grateful to them; accordingly our Author prescribes *Sugar* against *Worms*.

But let us hear what our Author says of the Faculty of Fruits, or the Juices expressed from some Fruits. 'I saw some *Worms*, saith he, put into the Juice of Grapes, that died in half an Hour, and look'd as if they were hard and dry. Therefore why shou'd we believe all the *Species* of *Fruits* assitant to the Generation of *Worms* in Children? This I must think is false; since *Apples*, *Pears*, *Peaches*, *Nectarines*, are ground and chew'd by the Teeth; and in these Fruits, thus ground and reduced to Pulp, are contain'd *Worms*, which are depriv'd of Life in few Hours. The same happens to *Worms* detain'd in a Vessel, in which *Cherries*, or *Plums*, or *Strawberries* are press'd or squeez'd; but as these Fruits or their Juices quickly destroy *Worms*, so the fermented Juice of Grapes, namely Wine, does the same.

'Some *Flowers* are in like manner offensive to these *Insects*, as also Waters drawn from these *Flowers* and other the like Plants. To Confect of *Red Roses* and *Orange Flowers*, if you add a little common Water, *Worms* will dye in four Hours; but the *Flowers* of the *Hyacinth* bruised, kills 'em in half an Hour. The distill'd Waters of *Orange Flowers*, *Roses*, *Grass Roots*, destroy them in a short time; as also *Thyme* and *Penroyal-Water*; but these work slower, to wit, the Waters of sweet-

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' *scented Trefoil, Calamint, and Elder Flowers* ; but
' *Scorzonera, Sage, and Hyssop*, are the most sluggish
' of all.' Thus far this Author ; but that Error
may be avoided, he would admonish his Reader
not to take all these things to a tittle, as to the
space of Time in which those Worms are said to
die, and sometimes he cannot shew how the Wa-
ters were distill'd, or the Worms came to his hands,
whether *great or small, lively or weak.*

BUT it is not one Difficulty only that happens
here ; for first, the Experiments propos'd to be made
on *Earth or Ground-worms*, which our ingenious Au-
thor confesses, are not of the same *Species* with the
Worms disturbing Mankind ; and he perceiv'd this
Difficulty, which yet is not unanswerable, as by-
and-by we shall see, and that he shews depends on
another almost as insuperable and hinged thereon,
viz. that the Worms of Men are rarely to be had
alive ; besides that the Experiments taken from these
last *Worms* may be equally uncertain, at least in part ;
for we cannot know evidently whether the Death
of these *Insects* happens naturally, because they are
forc'd to be out of the Element in which they were
bred, or they perish from the Strength and Efficacy
of the Medicines acting upon them. But whatsoe-
ver else has been yet try'd by Physicians which
they have exhibited to Patients tormented with
Worms, our ingenious Author does not conclude
much more certain ; for such is the Difficulty, where
we are to be determin'd by Experiments in Physick,
that all things seem to be upon an Equality.

BUT the same Gentleman, who is praise-worthy,
does not yet desist from the Business he hath under-
taken, but, as an indefatigable Man, takes fresh
Worms excreted or voided from Men, and yet a-
live, and repeats the same, which he had try'd be-
fore on *Earth-worms*, and so proceeds to other new

Experiments, as follows : ‘ *Worms* produc’d alive
 ‘ from *Men’s Guts*, if kept in any dry Place with-
 ‘ out Moisture, soon die ; nay, they are dry’d from
 ‘ Death, or after they are dead, and being thus
 ‘ dry’d, may be kept a long time. The same may
 ‘ be kept alive in common clean Water, which pre-
 ‘ serves their natural Coldness, for 60, and some-
 ‘ times 70 Hours together. The same thing also
 ‘ happens to *Worms* of this Kind immers’d in Spring
 ‘ or Well-water, in which a Quantity of *Terra si-*
 ‘ *gillata* is put ; tho’ this is accounted, as it were,
 ‘ a Specifick, or a Defence against *Worms*. In
 ‘ Water wherein the *Coralline* Plant hath been mix’d,
 ‘ other the like *Worms* will live six or seven Days ;
 ‘ but thirty Hours in a Water ting’d with *Aloes*.

‘ IN like manner Powder of *Hartshorn*, *Rhinoceros*,
 ‘ *Elks Claws* infus’d in Water, does nothing more
 ‘ than common Water ; and so likewise the *Bezoar*
 ‘ *Stone*, whether *oriental* or *occidental*. But in Water
 ‘ well loaded with salt, human *Worms* die present-
 ‘ ly, and very soon in Spirit of Wine ; as what I
 ‘ have said happen’d to *Earth-worms*, yet with this
 ‘ Distinction, that they resisted the Strength of the
 ‘ *Medicines* longer than those of the human Body ;
 ‘ this wou’d scarce have been believ’d, had it not
 ‘ been confirm’d by Experience, which also shew’d
 ‘ that the *Earth-worms* mov’d quicker and brisker ;
 ‘ but those taken from the Bodies of Men seem’d to
 ‘ be heavy, dull, and more sluggish than the rest.

‘ THE *Earth-worms* were sooner kill’d in Wine,
 ‘ as I have mention’d before, and now affirm again,
 ‘ saith the same Author : But I have observ’d hu-
 ‘ man *Worms* soak’d therein live long enough, viz.
 ‘ 24 Hours, sometimes 40, nay 60 and upwards.
 ‘ Yet every body believes and affirms, neither are
 ‘ there wanting some worthy Men, who think with
 ‘ him, that the only approv’d Medicine, by Expe-
 ‘ rience,

rience, whereby Worms in Men's Bodies may be destroy'd and driven out, is Wine; if this was true, no body that lives in *Italy* wou'd be troubled with Worms. Thus far the learned *Rhedi*, speaking of his own Country, which with much better reason might have been said of some Countries more Northerly. But if it be ask'd, Why human Worms are less affected with Wine? It might be answer'd, perhaps this ought to be ascrib'd to the common Use of Wine, to which most Men are us'd by degrees from their Childhood; whence it comes that those Worms are also sensibly us'd to its Strength; and the like Reason is given why Poison by Custom is made natural to our Bodies. But *Earth-worms* being only us'd to their native Soil, and having never partaken of *Vine* and *Drugs*, are easier and sooner injur'd by them.

LIKE as *Earth-worms*, saith *Rhedi*, and many other *Insects*, perish in sweet-scented distill'd Waters, so human Worms die in *Rose-water*, *Orange-flower* and *Myrtle-water* in 10 Hours at most; and among those the smallest and such as are the youngest, and white ones, with those call'd *Ascarides*, are kill'd barely with the Touch of those sweet Waters. If you dissolve in common cold Water only as much Sugar as is sufficient for a *Julep*, and cast human Worms therein, they will die in three or four Hours at the most, as I have try'd six times by repeated Experiments.

BUT what relates to the Smell of the compound Oils already mention'd, that is no way hurtful to our Worms; nay, anoint some Worms with those Oils, and he asserts they will continue living a long while after; so he finishes his Observations made on human Worms. Hence we may infer, that almost all *Drugs* which offend or hurt *Earth-worms*, act the quite contrary on those of Men, and

vice

vice versa; whence it follows, that those Experiments were not useless, which were made upon *Earth-worms*, nor the Distinction which happens betwixt the Form of the internal Parts of both Kinds which seem to obviate the first-propos'd Difficulty.

I have never yet attempted a Tryal on *Worms* educed or taken from our own Bodies; but since I have seen Experiments with which that learned Gentleman hath demonstrated how *sweet things* are obnoxious to *Earth-worms*, by which this Argument may be further clear'd up; first of all I took *Corn Milk* from among other kind of *Sweets*, and threw *Earth-worms* therein, which I saw swimming about with Ease, and so remain'd for many Days. But take care lest the Milk sour, which ought to be shifted often, and also lest there be too much Quantity; for they being us'd to lie at the Bottom of the Pan, and not being able to rise to the Surface, are sometimes suffocated, because the Air cannot penetrate the Milk, especially if cover'd with *Cream*, it can never reach the Bottom.

THE same thing, for the very same Reason, happened to some *Worms* kept in a Vessel in which I had thrown *Mucilage* of *Quince-seeds*; but these being cover'd four or five Fingers deep in the *Mucilage*, died in a few Hours; but others being put in to the same Liquid one Finger, liv'd several Days. Nay, I took four other *Earth-worms*, and put 'em in a Vessel almost soap'd round in *Mucilage* of *Fleabane-seed*, so that they could not get out, and they were kept there alive 12 Days, altho' I cover'd 'em over once or twice every Day in the same Liquor. notwithstanding, the 12th Day, three were escaped, the fourth only remain'd, and that was very lively. Yet in a Decoction of *Marsh-mallow Roots*, made in to a slight *Mucilage*, I saw the *Worms* die in three Hours. But in an *Emulsion* of the cold *Seeds* and A

Worms, some *Worms* of the same Kind died in twelve Hours; and others in a part of the same *Emulsion*, sweetned with *Sugar*, only liv'd two Hours; and all of 'em appear'd flaccid after Death.

In a *Decoction* of *Polypody Roots* they continu'd about eight or nine Hours, but were very flabby, and almost wasted away. A *Decoction* of *Sebestens*, as it is variously prepar'd, kills the same *Insects* sooner or later. I boil'd three Ounces of *Sebestens*, with the Shells, which yet I separated from the Pulp in one Pound of Water, to the Consumption of half; and into this *Decoction* I threw some *VVorms*, which were dead in about six Hours. In the second place, I left the same Quantity of this Fruit, where in an equal Weight of Water they might stand all Night near the Fire, to soften the more easily, and at last boil'd them to a third Part; in the strain'd Liquor, when cold, I immers'd four or five *VVorms*, that were extinct within four Hours at the most: 'Tis observable, that they appear'd intirely contracted when dead, and a little before Death.

In a light *Infusion* or *Decoction* of *Liquorice* these *Insects* will continue alive many Days; nor do they seem to be much more disturb'd with this *Decoction* than with common Water: Nay, in a pretty strong and sweet *Decoction* of *Liquorice*, taken fresh from the Ground, they die not sooner, tho' all their Skins are torn off their Bodies. But in dry *Liquorice*, especially the *Spanish*, boil'd in Water to a Consumption of two Thirds, they die in 20 Hours, and sometimes in 15 or 16, being wither'd and naked. Likewise in half an Ounce of the *Extract* or *inspissate Juice* of the same Root, dissolv'd in three or four Ounces of Water, I have seen those *Worms* perish in 20 Hours, divested of their *Skins*. But the Powder is the most opposite or destructive to these *Worms*; for casting some upon them, or rolling 'em therein,

therein, they die in the fourth Part of an Hour; which when I first observ'd, I suspected it might proceed only from the Obstruction of their Pores, and try'd the same Experiment with the finest Powder of *Box-wood*, but herein they liv'd six or seven Hours, whence I understood there was some other Reason why the Powder of *Liquorice* acted thus upon them.

THESE are the Trials which I have made to supply in some Measure what may seem wanting in the Experiments of the learned *Rhedi*, to know what the various Species of *Sweets* cou'd do upon *Worms*. These had been more and more accurate, if I had not had too much Business upon my Hands. But if any Body enquires what the various Causes are of the Action of those *Sweets*, and I answer, first we must distinguish betwixt the *Insipids* and *Sweets*, properly so call'd. River Water is *Insipid*, which yet is call'd *Sweet*, compared with Salt-Sea-Water. This is no ways opposite to our *Worms*, because it is not properly *Sweet* but *Insipid*. The *Greeks* call it *ἄποινα*, that is, void of Qualities, as there is no *Taste*, *Smell*, or any active Strength or Virtue preceptible to the Senses in Water: For this Reason, the *Mucilages* of *Quince* and *Flea-bane Seed* are not injurious to *Worms*, because of their *Insipidness*, except they, by the thickness of their Body, may stop the free Passage of Air. Let us see in the second Place, lest we confound the various Species, or different Kinds of *Sweets*, one with the other. Some are merely sweet, and indowed with no other Quality opposite to it, which is rather grateful than offensive to *Worms*: The Juices of *Almonds*, *Pines*, *Pistachia Nuts*, and the cold Seeds, are like that of Milk when beat in a Mortar, and diluted with Water, they are made into an *Emulsion*; but these Juices differ from true Milk, in that

they are oily, and so consequently apt to obstruct the *Trachea* of Worms; besides, their grosser Particles subside in the bottom of Vessels, and seem to be something *Emplastick*.

THERE are other *Sweets*; as *Honey*, and *Sugar*, the *Sweetness* whereof penetrates deep into the nervous *Papilla* of the *Tongue* and *Palate*, thro' the Mixture of a certain *Salt* of its own *Kind*: And indeed *Sugar* is nothing else but a concreted Juice of a *Reed* growing in both the *Indies* and some other Parts, which may be said to be the *Essential Salt* of the same Plant; from which the *Juice* of Flowers and Plants elaborated by the *Bees* differs not much, which we call *Honey*, to wit, a *saline Sulphur* that easily *ferments*, so that from this as well as *Sugar* are prepared *Inflamable Spirits*: To this add the Viscidity of both *Juices*, which obstruct at once the Pores of the *Worms*, and cast the Points or Beards of their *Salts* deeper into them, or else stick closer to the Skin.

Liquorice, that is, the *sweet Root*, and its Taste tells us why it was call'd so; But beside its *Sweetness*, it has an *absterging* or *cleansing Faculty*, and as it is said of *Bitters*, it has a *savoury Taste*, depending on a *saline Principle* wrought in with a certain oleaginous Matter. First, a certain *Bitterness* indicates this Faculty of the *Liquorice* which lurks under the *Sweetness*, and discovers it self in the dry'd Root, if chew'd; *secondly*, its Use, since in *Coughs* and stuffing of the *Lungs*, as well in *Obstructions* of the *Kidneys*, from the *Stone* and in mucilagnious sluggish Humours; it is scarce to be believed that this Root from its *Sweetness* alone is serviceable in these Disorders, to wit, in softening the sharp Juices, which it does not so much by *sweetning* as *cleansing*. I knew a Man, who, as often as he chew'd *Liquorice*, was presently seiz'd with a Coughing, and a slight pricking

pricking Pain in his Jaws, and some by the Use of it are moved to *Stool*, which is also imputed to its *absterging Faculty*. But this Quality is not so great in the fresh *Liquorice*; because it is blunted by the abundance of Moisture, and hence it came that a *Decoction* thereof work'd slower upon the *Worms*, but in that which was dried, and the strong bitter *Decoctions*, the *saline sulphureous Principle* extricated from the soft sweet Juices, with which it was fetter'd, became more penetrating, and therefore affected those *Worms* the more, as the Experiments inform us: They were also heavily afflicted from the same Root, beat into a fine Powder, for the Beards or Points thereof struck deeper, besides that they likewise stop the Pores.

Marsh-mallow Roots, which are used in the same Cases, for the same Reason are Enemies to *Worms*, but their Virtue is inferior. But as to this, the *Polypody* overcame both the *Liquorice* and the *Althea*, whose *Bitterness* is equally mix'd with the *Sweetness*, so that from the same *soapy Quality* it follows, that this is noxious to *Worms*.

FROM the *Sweets* mentioned, the *Sebestens*, which is the *sweetest Fruit* of all, remain, the *Viscidities* whereof is such, that the best *Birdlime* in *Egypt* is made of it; viz. by beating and washing the Fruit when fully ripe. (See *Prosper Alpinus* of *Egyptian Plants*) But I prepare a *Decoction* of the same dry in which I have seen *Worms* die in a short Time, it was not very viscid or tough, so that to its *Viscidities* only as such, which was but small, I could not impute the sudden Death of the *Insects*. Therefore considering and seeking out for another Cause of this Death, I found, those *Worms* immersed in that *Decoction* were all contracted at and before Death, contrary to what happen'd to others which perish'd in bitter or sweet *Liquors*, hitherto taken No

ice of, which were wasted or shrivell'd up; but I take this to proceed from an *Astringent Quality* natural to this Fruit, which so lock'd up the Pores of these *Insects* that they died quickly. *Veslingius* seems to own the same Faculty, in his Notes upon *Alpinus*, affirming, ' that the Juice of *Sebestens* affords an excellent Remedy for stopping of *Carrhs* or *Defluxions* that fall upon the *Jaws*. Yet its *Glew* has an attractive, attenuating, and resolving Virtue, by which all *Tumours* are dissolved, and the Hardness soften'd. *Prosper Alpinus* says, that the *Arabs* believe and teach that the same *Fruit* is loosening.

As to the Business, it plainly follows both from mine and *Rhedi's* Experiments, that there is a great deal of Difference both of the *Bitters* and *Sweets* among themselves, and that they every one act differently; and tho' we also know some Causes for this Variety, yet it seems impossible to know them all. Who, for Example, affirms why *Worms* which die in a *Decoction* of *VVorm-seed*, *Tansy*, *Trefoil*, &c. within six or seven Hours, do live in *VVorm-wood* twenty-four Hours and more, and some Days in *Aloes*; tho' these are not less bitter than *VVorm-seed*, or emit a less nauseous Smell? As we are instructed by these Examples in our Enquiries into the Qualities of Medicines, it is not sufficient that we have regard to the kinds of *Simples* or their Qualities more obvious to our Senses, as for Example, *Coldness*, *Moisture*, *Dryness*, *Sweetness*, *Bitterness*, *Saltiness*, *Acidity*, &c. But that we descend to weigh and examine every single *Species*, which may afford us Remedies, and are therefore call'd *Specificks*, as well because they are taken from some *Species* of Plants or other *Simples*, as because they also perform some special and certain Effect in some particular Cases. Indeed the Causes of those Effects of the sensible Qualities

Qualities of the *Species*, the Knowledge of which was never shewn us, nor can any Age do it, except those particular *Species* can shew the *Figure*, *Situation*, *Connexion*, *Motion*, *Proportion* or *Disproportion* of their particular *Saline*, *Sulphureous* or any other *Particles* in the *Bodies* wherein they act; which perhaps will never happen; but in the mean *Time* it is enough to us, if we do not want the *Use* of try'd *Medicines*, tho' why they act this or that way we are at this present ignorant, and may continue long so.

BUT then, say some, these *Experiments*, whether made on *Earth-worms* or others educed from our *In-trails*, are nothing to the purpose, unless we cou'd know the *Simples* which wou'd destroy the *Worms*, while they inhabit with us, which is the *Thing* we chiefly inquire after, and which we have not yet a clear and evident *Reason* for. The first *Difficulty* occurring, arises from the *Nature* of some *Medicines* here proposed; for part of the best of them, and indeed the most efficacious, are not only *Enemies* to *Worms* in general, but also to those in human *Bodies*. *Muria* or *Caviere*, for Example, is intolerable to all Sorts of *Worms*, especially those in the *Bowels* of *Men*, for the same *Reason* as *Pepper* and *Spirit of Wine*, which will not agree with *Worms* in *Children*, neither without the *Fever*, or if the *Fever* rages, which it often does. But if we give this in a small *Dose*, they will scarce perform the expected *Effect* on *Worms*, since all use *Salt* with their *Meat*, and many People *Pepper*.

THE next *Difficulty* is, that those *Worms*, which, as *Rhedi* confesses, being driven from their own *Holds* and native *Soil*, and consequently half dead, cannot oppose *Medicines* so long as human *Worms*, which are, as I may say, in their own proper *Element*, to wit, in the *Foldings* of the *Guts*, and being there

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there more lively, are not so easily hurt by Physick. Hence in the third Place it happens, that *Medicines* appropriated to destroy our *Worms* are not immediately apply'd to them, but before they touch them, must pass thro' the Stomach into the *Guts*, where meeting with some new Ferment, or the Mixture of other Juices, they are very much changed; that altho' there was a Liquor in which those *Worms* being thrown, wou'd most certainly perish out of the Body; yet we cannot certainly destroy them in the Body, because the Medicine loses great Part of its Strength and Virtue, by mixing with the *Fluids*. Neither can the same Liquor be so thrown in by *Clyster*, that it shall immediately reach those *Guts*, because the *Fibres* thereof being too pliant and ductile, have not Strength enough to push the Clyster so far as the Medicine might act upon the *Worms* with its full Force and Efficacy.

BUT these Difficulties are not so great, as to render the Experiments already try'd useless; for first of the *Medicines* of the first Kind; to wit, the acrid and biting; the Power of which is demonstrated by the same Experiments on *Earth-worms* and others, voided from our Bodies; I say, many of these *Medicines*, nay, almost all of them, if given in a great Dose, have small or scarce any Virtue, but yet in a moderate and just Quantity perform their Effect certainly and securely. The same may be said of all other *Medicines* which do Good or Harm, or are useless, as they are given cautiously, or without Caution, sparingly, or profusely, moderately, or immoderately, after this or that Manner. So the Use of *Mercury*, as well against *Worms* as in other Diseases, is dangerous, or innocent, or else very useful, as it is administered in this or that Dose, or for this or some other Reason; so from the

Juice of green Leaves of *Tobacco*, a Syrup is made, as *Piso* asserts (in his natural History of the *Indies*) that may be given safely and usefully to grown Persons as well as Children, in a moderate Dose, against *Worms*: But if dry'd *Tobacco* infus'd in large Quantities in any Liquor be given, it may prove a Poison to the Man as well as the *Worms* with which he is troubled. The Ancients in like manner gave a *Pickle* of the Nature, if not the same with our *Caviere*, with *Pepper*, in due Quantity to Adults. *Garlick* likewise affords a salubrious Medicine to Children; namely, after the Juice is squeez'd out, to tye it in a Bag, and boil it in Milk, which sweeten with Sugar. See *Simon Paul. Quadripart Botanicum.*

Another Difficulty seems to be of greater Moment, nor can I deny but that the *Worms* in our Bodies are with great Difficulty sometimes raised out of their *Beds*, upon which Account I shall treat of some at the End of this *Chapter*; and they are more difficult to destroy, lying hid in the *Viscera*, than if voided from the Body, any pernicious Liquor was poured upon them; but those Things which appear so very difficult, are not therefore impossible. Then, least we fall into an Error by imprudently believing this or that, provoked by Experience, from whence if we will learn, *Worms* as well within as without us are kill'd by the same *Medicines*, which wants no other Argument to support it. And that the Fact is so, it may be proved from the single Example, and that a common one, of *Wormseed*; for if from this *Seed* or an *Infusion* of it, pour'd on *Earth-worms*, or those voided from our Bowels, as *Rhedi* demonstrates, they are kill'd; are not the same *Worms* as yet sticking in our Guts daily destroyed by the same *Seed*, as the Experience of old Women themselves proclaim? In like Manner *Enu*

la Campana, Tansey, Garlick, Mint, Rue, Horehound, Tobacco, and others of that Kind, which prove that *Worms* are destroy'd without the Body, and the Books of all Physicians inform us that these *Worms* which lodge in the *Intestines* are also kill'd, as the Vulgar themselves must acknowledge. This which has Relation to *Medicines* taken from *Bitters*; but the Reason for *Sweets* does not seem to be altogether the same. That *Bitters* indeed are Enemies to *Worms*, both common People and Physicians agree, but that *Sweets*, so grateful to these *Insects*, shou'd be said to destroy them, the Multitude exclaim; but several Physicians defend the Argument, especially the Experiments of *Rhedi*, which *Lucas Tozzi* opposes, who speaking of *Worms*, says thus: 'Whether from these, says he, which happen to *Worms* which ate without the human Body, from the pouring on of Liquors; and giving other Medicines, we can with Justice place or bring into the Body afterwards, I will not be so bold as to determine; because the Medicines taken in are much changed therein, from the Mixture of innumerable Juices which flow together in the Stomach and Bowels adjoyning; from whence it can scarcely be determined what the Change shall be; since we often find that Things which are sweet upon the Palate, shall become sour or bitter upon the Stomach, and so on the contrary. But this does not lessen our Suspicion of the Falsity that *Worms* are kill'd with Sugar. Since we are convinced that in Sugar; and some sweet Wines, that *Worms* breed, are entertain'd and live unhurt.' So far this ingenious Author, with whom I wou'd not disagree; as he wou'd argue the Experiments made by *Rhedi* of Sugar to be false. He might have repeated the same Experiments with little Trouble, and for that Reason have convinced him-

self of the Truth of this Matter. Neither does it follow from thence, that because some of the *Worm-kind* can live in *Sugar*, therefore *Worms* either humane, or terrene, of which *Rhedi* only speaks, must live therein. In the second Place, what relates to the Difficulty before proposed, we answer, that the same Reason may be given of *Sugar* and other *Sweets*, as well as other *Drugs*, which kill *Worms* as well within as without the Body of Men. Nay, if *Wormseed*, an Example of which we have used before, enumerated by *Rhedi*, and other *Drugs*, destroying *Earth-worms* in seven or eight Hours, and also *Worms* lodging in the *Faces* of Men, they wou'd be certainly kill'd, as is evident from daily Experience, what need of *Sugar* with that *Seed*, the sooner to kill the *extraneous Worms*, when that is a present Poyson to all that dwell in the *Guts*? Or if the same *Seed* received in the *Guts* is not so alter'd that it spent its Virtue, whereby it was a Poyson to *Worms*, which it met without the *Guts*; such might that be of *Sugar*, equally so changed, that it cou'd no ways operate upon *Worms*, which at other times it cou'd destroy, almost in a Moment. Notwithstanding as some Things taken at the Mouth, cannot be deny'd to have received great Alteration in the Stomach and Bowels, we shall neither affirm or deny rashly concerning the Effects of those Changes, but have Recourse to Experience.

BUT if we consult that, there are not Authorities wanting, as well Ancient as Modern, who have observed that the *Species* already shew'd, both of *Bitters* and *Sweets*, are troublesome, and vexatious to *Worms*, that live in humane Excrement. So sweet Apples, as they loosen the Belly, they expell *Worms*, and are commended by *Dioscorides*. So *Calius Aurelianus* prescribes a Decoction of *Seba*

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' *stems*, or *Liquorice*, of which a Pound to be infused in four Pints of Water, and boil'd to a third Part, for expelling *Worms*; and of three Drams of the Root powder'd, adding *Nitre*, make a Medicine to drive out the *Lati* or *Flat-worms*. The same Author orders two Drams of *Polypody*, with a Scruple and half of *Diagridium*. Now I thought the principal part ought to have been that of *Diagridium*, of which with other *Purgatives* more hereafter; altho' *Electuary* of *Sebestens* has a Quality to expel *Worms*, as *Calius Aurelianus*, some *Arabians*, and also *Paulus Aegineta* and *Aetius* write. They also commend *Honey* against *Worms*, and beside these sensible Qualities, there was another Faculty inherent, which they call'd *innominate* or *nameless*, not different from a *specifick Quality*, and among other Things they assign'd *Honey* to have an *absterging Virtue*, to open the Mouths of the Vessels, and to destroy Vermin, which *Dioscorides* had observ'd, so for that Reason it may be said to be noxious to *Worms*, as hath been hinted before.

THAT Kind of *Sugar* we use now, was not known to the Ancients, so that it is no Wonder that they were so silent about its deadly Faculty to *Worms*; but among the *Moderns* there are not many who make mention of it. The first of Note is *Aldrovandus*, in his Book of *Insects*, who tells us, 'a certain Girl, by taking of a Lump of *Sugar*, voided several round *Worms* by Stool.' And this Testimony ought the less to be suspected, because it was publish'd long before *Rhedi's* Time, and therefore his Opinion cou'd not be prejudic'd from any thing said of *Sugar* by that Author. So I knew an Empirick before the Publication of that commendable Work, expel *Worms* by *Sugar dissolved in Wine*: And I have heard that several Women who have Children in *Provence* troubled with *Worms*, give them

them Water well sweetned with *Sugar*, and that they have used this Practice some Time. The Observation of *Andry*, in his *Generation of Worms*, is yet fresher, concerning the Boy, who having eat a great deal of Fruit candied with *Sugar*, voided abundance of *Worms*; but the Destruction of those *Worms* may, perhaps, be imputed to the Fruit alone, without the Assistance of the *Sugar*.

It hath been observed long since by others, that *Worms* in the Guts have been destroyed from eating of *Fruits*. This Quality is assign'd to *Raisins* by *Leinnius*, who liv'd an hundred Years before *Rhedi*, and whose Words are these: 'I have it confirm'd by Experiment, that the *Worms* in Children are expell'd by eating of *Raisins*, if fasting, and adding no other Food to them. For as *Bitters*, so *Sweets* are Enemies to *Worms*, for it happens that by the plentiful eating of this sweet Aliment, they distend and burst themselves.' And *Andry* affirms that he has tried the same a great many Times.

We are also supply'd with an Example of sweet *Fruits* driving *Worms* out of *Men's Guts*, from that *Emulsion* of *Gourd*, *Melons*, and other cold *Seeds*, which being taken by a young Man, he voided several *Gourd-worms*, which *Dr. Tyson* relates, Chap. 5. Paragraph the 4th: Nor were these *Worms* call'd so, by Reason of their *Form* or *Figure* resembling *Gourd seed*; but the same Author seems to indicate that we shou'd believe, that this Similitude of Form was a Sign or Token stamp't upon it by Nature, that we might know from thence, these *Seeds* were the noblest Medicine against those *Worms*. If the Matter had been so, which *Tyson* says of that imaginary Signature of Things, it had been easy to have shewn his Vanity. But in these Cases singly, the *Emulsion* did not expel the *Gourd-worms* by itself, or thro' its own Virtue, but the Expulsion of those

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those *Worms*, is chiefly to be attributed to the *Sugar* or, Syrup mix'd therein. And tho' those *Seeds* might be very useful, and answer the Symbol, yet the Experiments propos'd, will weigh with me, whereby it is shewn, that *Worms* being cast into an *Emulsion* of those *Seeds*, not sweetned with *Sugar*, by that Means will die, but it will be much slower.

AND there are many Physicians, among whom *Savonarola* was one, who died two hundred Years before *Rhedi* was born, that prescribe the eating of *Almonds*, *Pistachia Nuts*, and other *Sweets*; as *Dactyles*, *Raisins*, *Figs*, bak'd *Apples*, *Nuts*, and *Chestnuts*, to Children that are subject to *Worms*, that they may be preserved from them. Nay, *Savonarola*, speaking of taking care to prevent *Worms*, 'among the cooling Medicines which destroy *Worms*, recommends *Asses Milk*, and the like, drunk in large Quantities, and for want thereof, *Goats*, or *Cows Milk*, adding this Advice, that such like *Sweets* taken plentifully, is the Cause of the Death of *Worms*, and the Remission of many ill Symptoms.

THEREFORE, from many Arguments deduced, not only *a Priori*, as the *School-men* say, but *a Posteriori*, it will appear evident that *Sweets* are deadly Enemies to *Worms*; for these being grateful to the Palate, if *Worms* prove troublesome to us, they are certainly destroy'd or expell'd; we therefore in vain, nay, cruelly, may torment Children, by compelling them to take *Worm-wood*, and I know not how many *Bitters*, instead of *Sugar*, that is more acceptable to them. But if *Sugar*, or *Honey*, whose Taste is most pleasant, and cannot otherwise injure us, have the same or better Effect against *Worms*, than *Bitters*; why should not we be content with them, and rather reject those which are not only ungrateful to the Palate, but sometimes hurtful to

the Body, or at least begin with those *Sweets*, nor have such a Contempt against any, except where the Cure obliges us? *Aldrovandus*, as we before noted, long since observ'd a *Girl*, by eating of *Sugar* excreted several *Worms*. But the Experiments were few, from which this Observation was confirmed, even from the Time of *Aldrovandus* to *Rhedi*, which perhaps may be ascrib'd to the Incredulity of Physicians. Indeed those who are persuaded that the *Sweets* are the most grateful Food for *Worms* from their Childhood; those who hold that Summer Fruits, with which Children gorge themselves, are not only the *Feeders*, but the *Breeders* of *Worms*, will scarcely ever be induced to believe that *Sweets* or these Kind of Fruits can ever be destructive of those *Vermin*. But after *Rhedi's* Experiments were known, it is a Wonder that the Books of Physicians do not refer to the Examples of Children freed from *Worms* by the help of *Sugar*, *Honey*, or *Fruits*? And now their Want of Faith is not only to be blamed, but their Negligence accused; and that the more, because the Way was chalk'd out by some of the ancient Writers of Physick, among whom some allow Experiments are to be try'd, tho' by the Death of Men; and certainly then those may be done, which are *easy, pleasant, and safe*. What Trouble, what Labour, the Sick are freed of, particularly Children; but also the Physicians themselves, if with these grateful Medicines, *Worms* can be driven from the human Body with that Ease, which before we were persuaded cou'd only be done by those unpleasant ones?

As the Thing seems to be put out of all Doubt, from the Experiments mentioned of *Rhedi*, and to these add no small Burthen, as we have explained it in Relation to *Sweets*, made use of by the Ancient Physicians against these *Insects*. But say some, that

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that *Rhedi* try'd the Efficacy or Strength of *Sugar* to be six times greater on *Worms* educed from human Bowels, but I wish he had exhibited the same Remedy to those who were afflicted with these Insects three times with equal Success. But no such Thing is said or done by him; there are also few Observations of those ancient Authors, from which we are taught whether the other *Sweets* had been usefully administred against *Worms*; nay, there are very few, if compared with the others, who affirm that the Business is done by I know not how many ungrateful Drugs. These Things appear not without Reason to meet Objections, nor can the long and frequent Use of *Bitters* hitherto against *Worms* be deny'd, and the much rarer Tryals of expelling them by *Sweets*; but what shall we infer from thence, whether we ought to insist on *Bitters*, and reject *Sweets*? Few People, nay, very few, will repeat those Experiments again and again, till we certainly know whether these *Sweets* are really useful or no; and the *Bitters* in the mean time to be continued, nor the others despised, than as it will appear they are more or less usefess; but it may be that tho' these seem more useful for the Reason alledged, and the *Bitters* not altogether so, but in some Cases may be prefer'd. Whatever hath been, there is a great Hodge-podge of those unpleasant Medicines, which destroy *Worms*; nor was there ever so many Machines invented by Physicians against the most inveterate Disease, as have been against these little Creatures; a Catalogue whereof follows:

Simple Medicines against WORMS, taken from Plants.

Sorrel, great Galingal, Garlick, Alkanet three
Sorts, Angelica, Wolfes-bane, Arum, Birthroot two
Sorts,

Sorts, Afarabacca, Asphodel, Goats Beard, Bistort, Briony, Indian Reed, Carline Thistle, Onions, Succory, Contrayerva, Cross-wort, Sow-bread, the wild Cucumber, Galingal, Daucus, Dictamny, Dwarf-Elder, Enula Campana, Spurge, the young Shoots of *Oats*, boil'd in white Wine and drunk for some Days; Ferns of both Kinds, Bulbous Fumitory, Gentian, Liquorice, Grass, Hedge Hyssop, Hellebore all Sorts, Ipecacuana, or the Brasil Root, Hyssop, Jalap, Master-wort, Orrice, Dock, sharp pointed Dock, Lovage, Peaches, Mechoacan, Mulberries, Mountain Butter-bur, Pæony, Polypody, Leeks, Primrose, Pellitory of the Wall, Radish, Horse Radish, Rape, Rhubarb, Rosemary, Madder, Sanicle, Squills, Scorzonera, Pilewort, Devils-bit, Valerian, Virginia Snake-root, Zedoary, Ginger,

Leaves of

Southernwood, Wormwood all Kinds, Sorrel, Sauce alone, or Jack of the Hedge, Balm-mint, Plantane, Mugwort, Mouse-ear, White Beet, Betony, Birch Tree Leaves, from which an Extract is made, Bugloss, Box, from which an Extract and Oil is made, Calamint, Spurge, Motherwort, boil'd in Oil of Worm-wood and bitter Almonds, and applied to the Belly; Germander, *Chamaelea*, an Herb having Leaves like Olives, being bruised with Honey to half a Dram see *Celius Aurelianus*, and what we observe of the Doses of *Purgatives*. Ground Pine, Succory, Flea-bane, Coralline, Costmary, Artichoke, of which Cataplasms are particularly made. Cyprus, Dandelion, Dragon-wort, Dwarf-Elder, Agrimony, Fumitory, Galingal, Heliotrope, St. John's Wort, Hyssop, Dead Nettle, wild Lettice, Lavender, Bays, Flax, Marjoram, Peach, white

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white and black Horehound, Feverfew, Balm, Mint, Mercury, Myrtle, Nasturtium, Nep, Walnut, Christs Eye, or Clary, Origanum, Arsmart, Plantane, Poley-mountain, Purslane, Penny-royal, Mead-sweet, a Decoction of which was given by the Ancients against Worms and Cholick Pains; and 'tis also administred to Men. Raspberries, Rue, Savine, Sage, Satyrion, Scabious, Scordium, House-leek, Groundsel, Sena, Water-crelles, Nightshade, Tobacco, Tansey, Thyme, coarse or hairy Trefoil, sweet-scented Trefoil, Vervane, Birdlime, Nettles.

Flowers of

Oranges, Balauftians, lesser Centuary, Chamomil, Saffron, Hyacinth, St. *John's* Wort, Lillies, Hops, Peaches, Nard, Sloes, Roses, Elder, Spike, Stachas, Tansey, Betony, and Clove-gilly-flower.

Fruits, and the Juices of

Oranges, sweet and bitter Almonds, Barberries, the Juice of an *Indian* Fruit, the Measure of a Spoonful, with *Sugar*, see *Piso's* natural History of *India*. Cloves, Juice of Citrons, Coloquintida, wild Cucumber, Quinces, Dactyles, dry'd Figs, Fig Milk, Juice of Mulberries, Peaches, and other Fruits try'd by *Rheldi*, in his Experiments. Myrobalans, Wall-nuts, Chef-nuts, Nutmegs, Olives, Raisins, Apricock-stones, Pine-nuts, Pepper long and round, Pistachia Nuts, Juice of the Bramble, or Black-berry, Sebestens, Tamarinds, Wine, especially *Spanish*, *Canary*, and other generous Wines; Spirits of Wine taken at the Mouth, or apply'd to the Navel, being loaded with Powder of *Myrrh*, Vinegar, and also the Juice of unripe Grapes not yet fermented.

Seeds of

Sorrel, Bishops-weed, Dill, Aniseed, Oranges, Plantane, Smallage, Tansey, Orach, Mary-golds, Hemp, Cardamums, Cabbage, Cich Pease, Citrons, Coriander, Cost-mary, Cubebs, Cucumber, Gourd, Cummin, Rochet, Agrimony, Fennil, Fenugreek, Broom, three Kernels of the white Ivy, in Vinegar and Honey, the Fume of Henbane, for Worms of the Teeth. St. John's Wort, Juniper, Bays, Lentils, Lovage, Birds Tongue, Linseed, Lupine, Hops, and the Ashes of the Runners or Branches in Milk. Mangos an *Indian Fruit*; see *Clusius's Exoticks*; Negella, or Pepperwort, Melons, Navew, Nasturtium, Basil, Vetches, Parsley, Common and Macedonian, Hog-fennel, Poley-mountain, Leeks, Purslane, Flea-bane, Corn-rose, *Ricinus*, or the *American Pine Nut*, from which an Oil is drawn, Rue, Mustard, Worm-feed, or Holy-feed, Mountain-flax, Flix-weed, Stavifacre, Tansey, Nettles.

Woods and Barks of

Fir, Agarick, Aloes, Root and Bark of Capers, Briony, Filbert or Hazel, Bark of the Costus, wild-Ash, Guajacum, Ivy, Juniper, Molucca Wood, brought from those Isles; see the *Exoticks* of *Clusius*. Orange Tree, Citron and Peach, the Pitch Tree, Oak, Peruvian Bark, Sanders Wood, Sassafras, Turbith.

Concreted Juices, Gums and Refins of

Acacia, or the *Egyptian Thorn*, a sort of wild Sloe, Aloes, Gum Ammoniac, Benjamin, Asa Foetida; two or three Grains dissolved in Water or Vine-

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Vinegar; all the natural Balsams. Bdellium, Camphore, the Gums of the Cherry-Tree, Plum Tree, &c. Elaterium, Euphorbium, Soot, Galbanum, Gum Ivy, *Hypocistis* or the Sap drawn out of the Branches springing from the Root *Cystius*. Gum Juniper, Ladanum, Mastich, Myrrh, Opopanax, Pitch, Sugar, Sagapenum, Wine sodden, or boiled to a third Part, Scammony, Tartar, Turpentine, Frankincense, &c.

Oils of

Olives, all other Oils as well sweet, as acrid, expressed or distill'd, among which are Oil of sweet and Bitter Almonds, Oil of Box, Oil of the Hazel Nut, and Juniper wood, Oil of Juniper Berries, Oils of Myrrh, Frankincense, and Thyme, &c.

Simple Medicines against WORMS taken from Animals.

Elks Claws, Goose-grease, Boars Urine, the Ashes of Birds Feathers burnt, Bezoar, the Pastern Bone of a Bullock, and the Dung burnt and scented with Castor, Butter, Goats Dung dry'd and pounded, then given with Honey, destroys all Worms call'd *Tenia*. Old Cheese, Castor, Cantharides, the Marrow of Venison, Harts-horn, Ivory, the Gall of several Animals, the Fat of a Cock or Hen, the Bones and Urine of Men, the Smell of the Hair of an *Indian* Rat, Earth-worms, the Worms of the Guts dry'd, powder'd and taken; Honey, the Horn of the Unicorn or Rhinoceros, Powder of the After-birth of a Woman, Scorpions, Vipers.

Simple

Simple Medicines against WORMS, taken from Minerals.

Bole of Armenia, Quick-lime, from which Lime Water hath been made; white Chalk, Coral White and Red, *Mercury* or *Quicksilver*, which is given by it self simply and crude, as also the Water in which it is infused or boiled, the Sponge-stone, Stat-stone, Oleous Juices or Balsams distill'd from certain Earths or Stones, as *Petroleum*, Sulphur, Salts of all Kinds, Vitriol, especially the white, other Minerals, and first of all Antimony, with several Metals.

Some compound Medicines much used against WORMS, chiefly taken from Plants.

Benedicta Laxativa, Confect of Hamech, Confect of Hyacinth, *Diacarthamum*, *Diaphænicum*, *Diascordium*, *Diasebsten*, almost obsolete; *Diaturbith* with Rhubarb, Elixir *Proprietatis*, *Hiera-Picra*, simple, or mix'd with *Coloquintida*, *Hiera Logadii*, &c. *Mithridate*, *Matthiolus's Oil of Scorpions*, and many other compound Oils; *Orvietan*, *Philonium*, Syrup of Succory with Rhubarb, Syrup of Peach Flowers, &c. Treacle, Wormwood, and other Medicinal Wines, Ointment of Tansey, with a great many other Medicines of the like Nature to be used internally and externally, as distill'd Waters, Cataplasms, Decoctions; Electuaries, Infusions, Pills, Powders, Syrups, Tablets, Ointments, which may be taken from Physick Books; but I shall only propose some Forms of compound Medicines, for the sake of young Students, that I may save them some Pains and Trouble.

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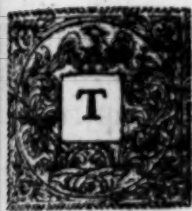
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A short Formula of Prescriptions
against WORMS.

Tablets or Lozenges of Turbith.



TAKE of white and red Sanders, Violets, Ginger, of each ʒij. Anniseed, Cinnamon, Saffron, Mastich, of each ʒj. Turbith in Powder ʒj. Rubarb, ʒx. Diagridium, ʒss. Take all these, and with a sufficient Quantity of fine Sugar, make them into Lozenges with Rose-water. The Dose from ʒij to ʒiij.

Amatus Lusitanus's Powder against WORMS.

Take Powder of Coralline, Wormseed, of each ʒij, white Dictamny, Bistort, Tormentil, of each ʒj. Being all reduced to Powder, and sprinkled with Vinegar, set them in the shade to dry. The Dose from half a Dram to ʒiij, according to the Strength of the Patient, and in the Disease this may be taken in Purslane Water, or Broth. *Note, the Largeness of the Dose is sometimes necessary, of which I shall have Occasion to say more afterwards.*

Simon Pauli's Powder.

Take Hartshorn philosophically prepared, of the Roots of Fern, of each ʒij. Coralline, Wormseed, Agrimony, of each a Dram; choice Myrrh, Lignum Aloes, Flower of Sulphur, of each ʒss. Make a Powder, to which sometimes add a fourth Part

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of Confect of Worm-seed, made with Grasse-water. With this Powder the Author says he used to expel all Kinds of *Gourd-worms*. The Dose a Dram or better.

Mynsicht's Powder of Mercury.

Take of Worm-Seed $\mathfrak{z}\text{xij}$, *Mercurius dulcis*, $\mathfrak{z}\text{v}$. Rhubarb, Turpeth, Coralline, of each $\mathfrak{z}\text{ij}$. of Roses, Hartshorn, Myrrh, of each $\mathfrak{z}\text{j}$. Tops of the lesser Centaury, Tansey, Camphore, of each $\mathfrak{z}\text{i}$. Oil of the Dog-tree distill'd by descent, Spirit of Vitriol, of each $\mathfrak{z}\text{j}$. make into a Powder. The Dose, from a Scruple to a Dram.

A Powder against the flat WORMS, from Nicolans Andry.

Take of Diagridium, Cream of Tartar, Diaphoretick Mineral, of each gr. x. Rhubarb, Roots of the female Fern, of each $\mathfrak{z}\text{ss}$. Leaves and Flowers of Tansey, *Pug. j*. Bark of the Mulberry Tree Root, before the Fruit is ripe, $\mathfrak{z}\text{j}$. mix all, and grind them together; then let it be taken fasting, in fat Broth, for one Dose.

Mancelius's Powder from Johnston's Idea of practical Physick.

Take of the Flowers of the lesser Centaury, Tansey, St. John's Wort, of each $\mathfrak{z}\text{ij}$. Leaves of Wormwood, Savine, Peach Flowers, of each $\mathfrak{z}\text{jss}$. Roots of white Dictamny, Gentian, Asarabacca, of each $\mathfrak{z}\text{j}$. red Coral, burnt Hartshorn, of each $\mathfrak{z}\text{ij}$. of the Seeds of red Purslane, Citron, Cummin, Sesily, Cabbage, Coriander, Sorrel, of each $\mathfrak{z}\text{ss}$. Rhubarb, $\mathfrak{z}\text{j}$. Myrrh, Saffron, of each $\mathfrak{z}\text{ss}$.
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Scammony, Troches Alhandal, of each ℥ij. Salt of Wormwood ℥j. Coralline Powder ℥ss. mix for a Powder, the Dose is from a Scruple to a Dram, in Cows Milk. The Dose of the Purgatives ought to be increased, and first of all Rhubarb, so that for a Dram, an Ounce ought to be added; the Salt of Worm-wood is useless, except a larger Dose be given.

Another Powder more simple.

TAKE Crude Mercury, of the Seed or Flowers of Tansey, Worm-seed, of each ℥j. white Sugar ℥iij. the Mercury may be broke by the Sugar, and the Seeds being pounded, reduce them all to a Powder, which may be taken in Honey, in Form of a Bolus. The Dose a Dram or better.

An Electuary.

TAKE of the Juices of Mint and hairy Trefoil, of each ℥ij. the Juices of Rue, and white Horehound, of each ℥j. boil them gently, with a Pound of white Sugar, which clarifie; then add Coralline Powder, and Tansey, with Wormseed, of each ℥ss. Cinnamon, Cardamomis, of each ℥ij. Citron Peel candied lbs. make all into an Electuary.

Schaffius's *Essence against WORMS, whereby the thickest WORM was voided, as is mentioned Chap. XIII.*

TAKE of Southernwood, Scordium, Tansey, of each Mj. Roots of Dictamny, Fern, Zedoary, of each ℥ss. Flowers of Centaury, Mj. Peach Flowers half an handful. Coralline Powder ℥iss. Wormseed, Coriander, of each ℥vj. Juniper Berrics ℥ij. Myrrh, Treacle, of each ℥ss. let them be cut and beat together, then infused in rectified Spirit of Juniper, separate the

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Tincture, and pour on fresh Spirits; then joyning the Liquors together, add Spirit of Hartshorn impregnated with its volatile Salt ℥ij. This is entitled the Essence against *Worms*.

Abacuch's Oil, taken from a Tract of Fehrius, concerning Wormwood.

TAKE of fresh Wormwood lbj. Flowers of Centaury 3x. infuse in lbiv of Oil Olive for some Days. Afterwards take Roots of Gentian Green, white Dictamny fresh gathered, of each ℥iv. being sliced or cut grossly, steep them in a sufficient Quantity of white Wine, adding Wormseed bruised 3j. burnt Hartshorn 3j. Aloes Hepatick 3v. a Bull's Gall 3xiv. Ship Pitch 3x. a little Oil of Spike, mix all together, and anoint therewith the Pulses, Temples, and Region of the Stomach.

A Balsam against WORMS, and usefull for many other Things, call'd the Vegetable Unicorn.

TAKE of Aloes Hepatica, Myrrh, Frankincense, Storax, Benjamin, Amber, of each 3ij. Saffron 3vj. Flower of Sulphur 3vj. Treacle 3vj. Oil of Turpentine 3ij. powdering and mixing all together well, pour thereon Spirit of Wine, in which Juniper and Wormwood have been infused, as much as will cover them eight Fingers deep: Then digest in a sand Heat, in a glass Body and Head; In the Distillation you will have a spirituous Water, and an essential Oil, which mix together, and keep close stopt for Use. The remaining Body in the Cucurbite, when cold, strain, and you will gain an excellent Balsam, with which anoint the Navel; some Drops of this may be taken inwardly in Wine,

or the like : To these Forms we will add some others taken from the Writings of the Ancient Physicians.

*Compound Medicines, or Preparations more in Use
against WORMS, taken from Minerals.*

FROM *Antimony*, by the help of *Nitre* &c. is open'd the Body of *Sulphur*, and several things prepared, as the *Tincture*, *Calx*, and several *Diaphoretick* Powders, which as they are proper for curing many Diseases, so they destroy *Worms*. Hence also come the *Flowers*, *Liver*, *Regulus*, and *Glass* of *Antimony*, from which are made various Medicines, *Emetick* and *Cathartick*, that are powerful Destroyers of *Worms*, as *Sala* and *Glauber's* *Emetick Syrups*, as also *Tartar* and *Emetick Wine*, &c.

FROM *Antimony* and *Mercury* are extracted *Cinnabar* of *Antimony*, *Bezoar Mineral*, *Mercurius Vita*, &c. From *Mercury*, by means of Salts, or other Dissolvents, by Sublimation or Precipitation are prepared various Medicines against *Worms*; as *Mercurius Dulcis*, *Turbith Mineral*, and other Precipitates. *Æthiops Mineral* is made from *Mercury* and *Sulphur*, and is of a black or violet Colour; and there is an excellent Powder made by working, and as it were amalgamating crude *Mercury* with *Sugar*, till it is wrought to a Powder.

FROM *Iron* and *Sulphur* is made a *Crocus Martis* that destroys *Worms*; from *Sulphur*, common *Salt*, *Vitriol*, and *Nitre* are drawn acid Spirits of great Force and Virtue. From the *Caput Mortuum*, or *Feces* of *Vitriol* and *Nitre* is made the *Arcanum duplicatum*, which is a gentle *Cathartick* or *Purge*, and one of the best Remedies in these Cases. The *Oil* of *Vitriol* is also commended, as likewise the

Tartar Vitriolate, which is an incomparable Medicine in its Kind.

FROM *Tin* and *Lead* heated and quenched in *Purflane* Water, is made a very good Medicine, and some assign great Virtue to the Load-stone taken in Powder. Nor are there wanting those who have their boasted Preparations of *Silver* and *Gold*.

SEE, here is a large Troop of Succours! Behold a vast Field of *Drugs*, simple and compound, to be taken inwardly or outwardly! So that we must look to, that we are not deceived, or drowned in too great Plenty, so that wand'ring in Pleasure, perhaps we prefer Medicines of little or no Effect to others that are the best, to the great Damage of our Patients, or else we give them Poison instead of Antidotes. It had been easy for me to have given a long Catalogue of *Drugs* that kill or bring away *Worms*, which are describ'd in the Writings of Physicians. But as it is but Justice, that all those Things shou'd be weigh'd in the Ballance of Experience, therefore I wou'd not undertake it.

THE learned *Rhedi* complains that he met with a great many Medicines recommended from Authority against *Worms*, as of apparent Probability, which were doubtful and uncertain Conjectures; and I shall readily agree with ingenious Men, that the Luxury of their reasoning with so much Accuracy and Philosophy oftentimes shews the Barrenness of their Facts, and their Penury or Want of Experiments, which some time ago I exposed in my History of Physick, written in *French*, explaining the Systems of the Ancient *Empiricks*. But the Number of Medicines in Use is so great, that it is scarce possible, but that more of them, at least some (beside those omitted by me, and *Purgatives* which *Rhedi* lays great Stress upon) are really Enemies to *Worms*, and perform those Things which the

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Books of Physicians promise. Of these Medicines, as the *Sweets* seem to be prefer'd to the rest by that industrious Author, a great Part are taken from Plants and other Things which have an *acid, bitter, sharp, sour, biting Taste*, an *aromatick or stinking Smell*, and are therefore very *pungent, deterfive, or astringent*; whence they may be able to vellicate, corrode, or shrivel up the Worms, and injure them so many ways, that at last they kill them, or make them fly their Habitations.

ALL *Bitters* are not so noxious to Worms as they are commonly thought to be; as for Example, *Aloes*, own'd by *Rhedi*, as is prov'd, yet which of these, *Wormwood* namely, kill'd these *Insects* in a Day's time the same Author acknowledges. If all *Bitters*, as *Bitters*, do not upon that Property kill *Worms*, yet the Effect of them is great, howsoever it is perform'd agreeable to Experience, that beside *Wormwood* there is the Example of *Wormseed*, which *Rhedi* owns is a Poison to Worms; and this is not only by Physicians, but by *Women* and *Children* themselves; whence this Seed is call'd *κατ' ἐξοχήν*, or by way of Eminence, *Wormseed*, as distinct from all others by that Name.

THE *Coralline*, a Species of *Sea-Moss*, is said to have the same Virtues, and is call'd, by way of Distinction or Eminence, the *Worm-Herb*, by the modern *Greeks* *σπικηνοβότανον*, as *Brasavolus* attests; for he, *Matthiolus*, *Mercurialis*, and others, seem to prefer it to *Wormseed*, and declare strange things of its Virtue in expelling Worms. 'There is no Remedy, saith *Mercurialis*, which commonly destroys all Worms, there is no such present Relief as that call'd *Coralline*, which is a *Sea Moss*. This your *Mountebanks* use in Powder, and do Wonders. I have seen an incredible Quantity of them thrown off by this Medicine only. Of this Moss also *Matthiolus*

thiolus saith thus; ' The *Sea Moss* is a capillary Herb, and call'd in the Shops *Coralline*. The *Mountebanks* sell it in Powder, in the Streets, to kill Worms in Children, and get great Praise thereby. The reason why it excels other Medicines is, because it does not only kill the Worm, but brings it away the same Day, to the great Admiration frequently of the Spectators; because some time a Child was seen which voided an Hundred Worms from taking a Drachm of this Powder. But *Bra-savolus* writes, that an old Man of Eighty two, at the Extremity of Life, happen'd to be afflicted with Worms and a Difficulty of breathing, such as Children have in that Case, voided Five Hundred Worms by a Medicine of *Scordium* and *Coralline*, and he asserts, that all *Greece* use this for Worms.

But that I may prefer *Coralline* to *Wormseed*, if I believe proper Experience, I must not deny the Excellence of this Medicine: But how it acts upon Worms, is easily understood from its falfuginous bitter Taste; nor do they appear to me to oppose the Experiments of the celebrated *Rhedi*; whereby he might have given a better Rank to this *Sea-Moss*, among the Medicines that drive away Worms. Having made a strong Infusion, saith he, of *Coralline*, by means of a *Balneum-Mariae*, I put four Worms into that Water, which perish'd there the Seventh Day. Therefore we believe *Matthiolus*, and many other Physicians, who affirm from their own Tryals, that the *Coralline* is an efficacious Medicine against Worms in Children. It may be answered, that the *Coralline* powder'd and given in Substance, as they say, in a proper Dose, by an Infusion or Decoction thereof, might operate more powerfully. This hath been the Opinion of all Physicians writing Forms of Medicines against Worms, that the Powder of *Coralline* is to be preferred

ferr'd to the *Decoction*; for the Reason is different
 for the Ferment of the Stomach, from that of com-
 mon Water. This only draws out a light Tincture
 of the *Coralline Powder*, whose *Salts* or *Sulphurs*
 are more fix'd; but from the Ferment of the Sto-
 mach that Powder is so intimately dissolv'd, that all
 its active Principles are perfectly extracted. The
Coralline being dissolv'd after this manner, or a strong
 Tincture made of it, it is presently convey'd from
 the Stomach to the *Guts*, and distributed thro' the
 whole Tract of 'em, proving a powerful Enemy
 to the Worms. The Nature is quite different of
Wormseed and other simple Medicines of the like
 Kind, whose Taste is very bitter, and the Smell *aro-*
matick or *stinking*; for the *Decoctions* or *Infusions* of
 these will scarce work; but the Powder taken in
 Substance, by reason of its *Bitterness* or *Odour*, easily
 communicates itself to all Kinds of Liquors.

In the next place *Tansy* ought to be join'd to the
Coralline and *Wormseed*, because it has something in
 common with them, from its opposite Faculty to
Worms, and is call'd by some People the *Worm-herb*,
 as the *Germans* and *Danes*, saith *Simon Pauli*. Those
 Names given by whole Countries seem to deserve
 our Regard; but if Names ought to agree with
 Things, then it follows, those Plants, mention'd by
 the common and general Opinion of all Nations,
 wou'd be found destructive of Worms. 'The Heads
 ' and Seed of *Tansy*, the same learned *Pauli* says,
 ' the Quacks use to expel Worms with, and do with
 ' wonderful Success destroy those in Children. Nei-
 ther do some Physicians of Eminency condemn this
 Medicine; for if a *Decoction* of the Leaves of this
 Plant can sooner kill *Earth-worms* than a *Decoction*
 of *Wormseed*, as has been demonstrated already,
 the Strength thereof cannot but be the same upon
 Worms in our Bowels, as we have an Example in

Wormseed; which Experience from thence informs us of, that it acts as powerfully upon Worms of the Guts as those of the Earth.

Nor does the *Trifolium Fibrinum* act slower upon Worms in our Bodies, for the same reason, tho' 'tis a very deadly Enemy to *Earth-worms*, yet had not gain'd a Name among the *Worm-Expellers*. With this we may reckon *Rue*, *White Horehound*, *Feverfew*, *Enula Campana*; but all these, except *Feverfew*, have been reckon'd Expellers of *Worms*, and the last rarely mention'd for that Use. Thus far of *Bitters*; and we have here nothing to add of *Sweets* and oleous *Medicines* besides what hath been said, neither of those whose *Acrimony*, *Acidity*, or *Saltness* are intense or manifest. For these Experiments shew they work powerfully on *Earth-worms*, of which we have treated already; nor ought Physicians to be diffident on that score, that they are capable of killing Worms that inhabit the Body. But there are a Multiplicity of Medicines to be met with in the *Catalogue* exhibited, which since they seem to be endow'd with no sensible Quality, why they can be said to be Enemies to *Worms*, is not so easy to be understood. Of this Kind is *Purslane*, which, altho' 'tis not insipid, or acid, or biting, or bitter, why it should be so aptly qualify'd to void *Worms*, is hard to find out. Yet the Ancients long since observ'd this Virtue in it, and the Moderns recommend the distill'd Water as a Destroyer of *Worms*; whether because this solitary Herb hath a little Sharpness with it, as the Ancients remark'd, or the Taste of it is nitrous, or may have something of the Sulphur in it, whereby it induces gently to sleep, approaching in some measure *Poppy*? *Grass*, in like manner, is insipid, yet the distill'd Water thereof is commonly given against *Worms*, and being pour'd upon those voided from Men's Bodies, according to *Rhedi's* Experiment, proves

also

also deadly. Yet *Beet* seems to be the most insipid, whence *Martial* says,

—*fatua fabrorum prandia, Beta.*

and to be call'd a *Lover of Beets*, was as much as to say, a silly, insipid Fellow; but *Dioscorides* says the Juice of it is *nitrous*; so that it loosens the Belly, and may become an Enemy to Worms. To this we may add the *Bark* of the *Mulberry Root*, of which I shall say something as occasion serves. These and the like Plants, if they are observ'd to drive away or kill Worms really, and we cannot tell by what reason it is done, we necessarily rank them among *Specific Medicines*: But I think they ought not to be taken from the *Classes of Specifics*, as I have observ'd before, there are none among the *Bitters* or *Acrids* that kill Worms sooner or more certainly than others of the same Kind less *bitter* or *acrid*; as *Wormseed*, tho' not so *bitter* as common *Wormwood*, and cannot compare to *Aloes*; yet is a more powerful Medicine than both of them, as Experience shews. The distill'd Waters of *Roses*, *Flowers of Oranges* and *Myrtle*, are of the same Order, which, according to *Rhedi's* Experiments, much sooner kill *Worms* than *Hysop* and *Sage-waters*, tho' the latter are not void of *Odour* and *Sulphureous Particles*; whence we must have recourse to a Power or Quality *innominate*, as *Aetius* call'd it, but now indeed term'd a *Specific*. We may make the same Judgment of many other Medicines deriv'd from Plants. The Danger of Particulars every body may make safe, and learn by himself, whether those things are certain which Physicians say of them, or the Event will answer what is promis'd. There are in the Order of Plants, *Purgatives* remaining, which I shall by-and-by touch upon, when I speak of them which are taken from Minerals.

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The first thing we meet with, that relates to the *Animal Class*, is, the Powder of those Worms educed from the human *Intestines*, which being taken inwardly, are said certainly to destroy *Worms* of the same Kind that inhabit our *Bowels*. As their Fears are vain, who suspect that this Powder among the destroy'd Worms it meets with in the *Guts*, shou'd raise other new Worms there, as is imagin'd and said of *Wormseed*; except perhaps as *Vallisnerius* supposes, that is, that the Powder of the grown Worms is devour'd in the Eggs. But lest we should offend here, I hate the Medicine, altho' it performs the Effect promised from it, which, whether it can do, I know not, but in the mean time, I shall rather make use of *Earth-worms*, which are said to be as good, if not better. From *Hartshorn*, and that of other Animals, or that of Bones, we find little or no Assistance, as *Rhedi* hath experimented; nor have I ever seen the Powders, Decoctions, or Jellies made from them do any Feats this way; but if the Horn is burnt, then, by being made a little acrid, finely ground, and given in larger Doses, it is something more useful. *Cantharides*, propos'd by the Author of a Book of *Treacle* written to *Galen* as a Remedy against *Worms*, operate much more powerfully; but since the Use of them is otherwise dangerous, we can do easily without them, especially when we have such a *Glut* of *Drugs* much more innocent. *Castor* may be given safely, nor perhaps without Success; the rest of the Medicines taken from *Animals* seem to be such, that I ought not to bestow my Time on them.

BUT from *Minerals*, besides *Salts*, of which we have spoken, every body must own *Mercury* or *Quick-silver* to be a great Enemy to *Worms*. First of all a *Decoction* or *Infusion* made in hot Water, Physicians on all hands recommend, but without a good deal of

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of the *Mercury*, a long *Infusion* or *Decoction*, signifies little; but the same swallow'd *crude* and in Substance in a moderate Dose, will be of a greater Force and Virtue. Nor is there any Danger, as *Dioscorides* thought, from the *VVeight* or *Acrimony* thereof eating thro' the *Guts*. I give *Quicksilver* to two or three Ounces and upwards, not only to destroy Worms, but to those who are afflicted with the *Iliac Passion*; nay, that it may be securely administer'd, I have learned in this Case, that the *Mercury*, by reason of the Obstruction of the *Intestine*, after a long time, and issuing out as it were by Parts, opening to itself, by degrees, a Way or Passage, hath staid in the *Viscera* without any Inconvenience Fifteen Days and more, before the whole hath been voided from the Body, as it appear'd by inspecting the Excrements with which it always mix'd, during this time, and the Particles thereof were found. But for killing of Worms a Dram of *Mercury* may be safely given to the largest Children: But if besides Worms, there should be a *Venereal Case*, or the *Scurvy*, then abstain from it, lest from the *Saltiness* of the *Juices* in the Body the *Mercury* should be open'd, and thence a *Vomiting*, *Looseness*, *Salivation*, or other unexpected Symptoms should be raised: *Mercurius dulcis* requires the same or greater Caution, but with that, is of excellent Use. As to the rest, if you except *Salts*, the only thing among *Minerals* is *Mercury*, which without any Preparation is a Poison to the Worms: But all the rest, *Minerals* or *Metals*, cannot, without the help of the *Fire* or some dissolving *Menstruum*, acquire this opposite Quality to Worms. *Dolans* wou'd do great things with his *Golden Powder*, prepar'd from Native *Cinnabar*, *Mercurius dulcis*, and *Gold*: But in this Affair I shou'd be satisfy'd with *Cinnabar* or *Mercurius dulcis*, and keep the *Gold* for other Uses. Whatever may be pretended, neither

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Gold, or any other *Metals*, except dissolv'd, do any Thing here, except *Iron*, the Rust whereof being swallowed, and dissolved by the *Ferment* of the *Viscera*, may kill Worms; *Antimony* it self, while crude, does little or no Damage to them; but being prepared, it supplies us with *Medicines* which purge upwards and downwards, and are powerful Adversaries to the *Worms*.

To these may be added some not of less Force, as the *Emetic Cathartick* taken from Plants, viz. white *Hellebore*, or the black, which is safer, *Spurge*, *Coloquintida*, *Elaterium*, *Esula*, *Euphorbium*, *Gratiola*, *Ipecacuana*, *Laureola*, *Ricinus*, &c. These stronger Purges, since taken from Plants, as well as Minerals, that drive out and destroy Worms, we may easily understand, if we consider their violent Force, which the softer Texture of the Bodies of those *Worms* cannot resist; and 'tis difficult to remove them out of the Guts, we find by Experience. It is with these *Drugs*, which seem to be the *Ultima Ratio Belli*, that the *Worms* are perswaded to move their Quarters; for these are like so many *Mortars* or *Machines*, that shake them out of their Beds or Holds, and afterwards throw them out as it were with a *Torrent*, alive or dead.

As the Impression of the more gentle *Purgatives* is lighter in the *Viscera*, so is the Action likewise upon the *Worms* contain'd therein. Yet *Rhedi* shews that casting them into a *Decoction* of *Sena* or *Rhubarb*, they died presently, from whence we ought to have Hopes that they will perform the same or like Effect upon Children troubled with *Worms* if taken inwardly. But if we are diffident that these and other gentle *Purgatives* will not do, 'tis better to add *Wormseed*, or some other *Specifick* already mentioned. Therefore since *Children* as well as *Adults* feel *Worms*, and daily want the Assistance of Physicians

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ficians to be relieved, let us see if we cannot destroy the tender Bodies of 'em, by using Medicines properly call'd *Drastick*, as *Syrup of Peach Flowers*, or *Roses*, or *Succory* with *Rhubarb*, as well as *Rhubarb* or *Sena*, and the *Infusions* thereof; but according to Age and Strength, some Grains of *Turbith*, *Scammony*, or *Jalap* may be given together with *Specificks*, as hath been observ'd, with a little *Mercurius dulcis*, which may also be number'd with *Catharticks*.

BUT while we speak of Purgatives, we may treat of some which may be applied outwardly as well as taken by the Mouth, and are said to purge. Of this Class are *Briony*, wild *Cucumber*, *Squills*, *Orrice*, *Sow-bread*, *Spurge*, *Dwarf Elder*, *Euphorbium*, *Coloquintida*, black *Hellebore*, *Scammony*, *Turbith*, *Tithymal*, *Ricinus*, *Sal Gem*, *Sagapenum*, *Pepper*, and other Aromaticks. From these and the like are prepared those Ointments of *Agrippa*, *Sow-bread*, &c. which outwardly rubbing upon the Belly, forces the *Worms* away, and makes a large Discharge by Stool. And indeed, the Sharpness of these *Simples* having very penetrating Parts, and piercing the Pores of the *Abdomen* and *Intestines*, or dispersing themselves into the little Branches of the Vessels in the Skin, being carry'd with the Blood thro' the whole Body, insinuate themselves, and afterwards move and ferment the Humours, and excretory Vessels of the Intestine Glands, as also of the Biliary Ducts, prick and open their Mouths to receive them, whereby they perform the promised Effect. We see, if the Thighs, Arms, and other external Parts of the Body be rub'd with a Mercurial Ointment, it will raise a copious *Salivation*, and sometimes move to Stool. 'Tis observed that *Cantharides*, externally apply'd, will often give a *Strangury*, *Detention* or *Heat of Urine*, and sometimes altogether.

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What then may not be introduced into the Body of a *Cathartick* or other Kind, from some Plants, or the like acrid Things, which we have been treating of?

BUT if any Man says, *first*, that it may be shewn such a Thing has been or is done, then for what Reason it may be done, we will produce Witnesses; and first those Ancients who first gave the Composition of those purging Ointments, and recommended the Use of 'em; *secondly*, among the Moderns we have *James Sylvius* an eminent Physician, who not only speaks doubtfully of the *Cathartick Virtue* of the same Ointments; but sometimes observes the Strength of 'em too great. 'Tis violent, says *Sylvius*, speaking of the Ointment of *Sow-bread*, and scarce safe, except in a robust or hydropick Body; it discharges a great deal of serous Excrement out of the Belly, and brings a considerable Advantage from that Evacuation.' If these Kind of Ointments wou'd safely purge the Body, what a vast Advantage wou'd they be in Physick, since Children and others wou'd submit to this kind of Purging, when they are hardly compell'd to take any Thing at the Mouth, because most Catharticks, are ungrateful to the Appetite? But we have heard *Sylvius* complaining of the Violence of these Remedies, so that he thought 'em only proper for strong Men, and Dropfical Cases, and therefore did not pronounce them very safe. Besides, these Ointments are very uncertain in their Operation, and procure cruel Gripes, so that the Use of them is almost, if not entirely, neglected among Practitioners.

THERE are Medicines still remaining, which applied outwardly, are said to destroy *Worms*, tho' by no *Cathartick Virtue*, but some other Quality. To this Point are referr'd all *Acrids*, and *Bitters* already mentioned,

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mentioned, as the *Species* of *Wormwood* and *Mint*, *Tansy*, *Southernwood*, *Motherwort*, *Rue*, *Artichoke Leaves*, *Garlick*, *Onions*: The Gall of several Animals, *Soot*, *Sulphur*, *Nitre*, *Sal Armoniac*, *Milk of Figs*, *Sandarach*, *Myrrh*, *Gum Ammoniac*, *Assa Fœtida*, and others of that Kind, as also *Petroleum*, *Hazel Oil*, *Juniper*, *Compound Oils*, *Vinegar*, *Spirit of Wine*, &c. But these and such like are little valued by the learned *Rhedi*, if only apply'd outwardly, as observed before; and certainly no Body will deny, but that they are much more efficacious, internally administred. Yet it is not improbable, but that the more subtle Particles of those Medicines may be received into the Body, and may expel *Worms* thereby, tho' they have not Power to kill them. Nay, only the *Smell* of these Things continually at the Nostrils, hath sometimes done great Matters, as in the Example of the Knife that *Baglivy* mentions, wherewith the young Man cut the Onion. But 'tis in vain to expect this from Medicines, whose Parts are grosser and more sluggish; nor cou'd I easily have believed that *Hen's Grease*, or *Deer Marrow* rub'd upon the Spine of the Back, as *Aetius* orders, cou'd disturb or offend *Worms* in the Belly.

BUT of these enough already. Therefore from the Premises hitherto explained, and this whole Chapter, it follows, *first*, that Medicines are to be given, which expel and destroy *Worms*; in the next Place, the Nature of them is so various, that some are *oleous*, others *salt*, others *acrid*, others *astringent*, others *bitter*, others *sweet*, and others *insipid*; some kill the *Worms*, and at the same time expel them the Body, as *Purgatives*; some seem to act by a known, others an unknown Quality. *Thirdly*, from those which are comprehended under the same kind, some seem to work quick, others slow, and some much slower, and so *Rhedi* informs us, in *Wormseed*

seed for Example, which kills those Insects in seven Hours, *Wormwood* in twenty, twenty four or thirty Hours, and *Aloes* only after the third Day; tho' all these three Medicines are in the *Classes of Bitters*. Nor is this the only Advantage of the Experiments made by that ingenious Author; but the many common prejudiced Opinions generally received, are here refuted, concerning Medicines which can destroy *Worms*. So *Bitters*, *Acrids*, *Salts*, and all other pungent and biting Things are Poison to *Worms*, but every Body believes that the *Sweets* raise, feed, and maintain them; but we gather from hence, that this is false, because the *Sweets*, nay the *sweetest* Things of all, as *Honey* and *Sugar*, are demonstrated by Experiments to kill them more certainly and sooner than the *Bitters*. Indeed the Examples hitherto have been very scarce, as we have already hinted, of Patients freed from *Worms*, by means of those *sweet Remedies*; but we hope these Precedents may be multiply'd hereafter. But *first*, they are worthy of Consideration, which follow from the few Experiments we made with those of *Rhedi*, which stand to Reason, whereby the aforesaid Medicines of what Kind soever are found out to be hurtful and deadly to *Worms*; and indeed if we consult the common Opinion, the recited Drugs are not believed poisonous to *Worms*, except from these *Insects* latent in our Bodies, some part whereof is drawn in with the *Chyle*, or other nutritious Juice agreeable to them; that is, it is taken in at the Mouth of those *Insects*. Hence it is that with *Bitters* for Example sake, which are esteem'd very offensive to them, the Parents industriously mix *Sweets*, not so much that the Medicine shou'd be more acceptable to the Children, but because they think that the *Worms* chusing the *Sweet* may thereby be the easier induced to suck up the Poison mix'd with it. Indeed I will not deny

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ny, but it may sometimes happen that *Worms* die by devouring of some Juices that are contrary to them, but this I believe to be rare. For he that by Instinct taught the rest of the Brutes to avoid or shun such Food or Aliment as shou'd be pernicious to them, probably gave the same Benefit of Nature to *Worms* also. But granting this to be uncertain, that will at least be certain, which is confirm'd by Experiments already try'd: There is another way that the same *Insects* may perish, namely, by casting such Juices upon them, as their Strength is not-able to support; but if we cannot doubt of this Cause of their Death, we seek in vain for another more uncertain. But if any one says, the Medicines taken by the Sick, which the *Worms* receive, do not affect those *Worms* with that ease, as they do those which are taken out of the Body, and put into some Vessel wherein the poisonous Liquor may be pour'd upon them, of which we have spoke before; the Answer will be, that these *Insects* are indeed more difficult to be hurt by that Liquor in their hiding Places, and hence it is they do not presently give way, or are overcome by Medicines; but if the same be repeated again and again, with some Intermissions, and given in a proper Dose, then they will scarcely be able to elude or avoid the deadly Power of those Medicines. But we shall have Occasion to say more of this Difficulty by and by. And now let us see what Remedies may be most proper to expel every distinct Kind, or all Sorts of *Worms*.

THERE are three Kinds of *Worms* particularly troublesome to Mankind, to wit, the *Teretes* or round *Worms*, the *Ascarides* or little short *Worms*, and the *Lati* or flat *Worms*, as hath been described; but the Medicines pointed out by us, how undistinguish'd they may appear to be, have Relation

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especially to the two last, which require a particular Consideration and special Cure.

CONCERNING the *Teretes*, it is enough to observe, that of all the Medicines call'd *Vermifugæ*, or *Worm Expellers*, to begin with the gentlest, since they are easier to overcome than other *Worms*; yet when they seem more obstinate, by degrees to make use of stronger. If any Thing remain further to be explain'd on this Argument, that may be expected when we come to handle that of the *Flat-worms*, and how both Kinds, or either of them, either yeilds to certain Medicines, or does not, or may be expell'd sometimes easily, and sometimes with difficulty.

THE *Ascarides*, tho' they are small, yet are not to be driven from their Holds, but by the strongest and most forcible Medicines; and that for many Reasons, one particular of which is, that those *Worms* stick close to the great Gut and *Podex*; besides, they are remotest from the Stomach, so that what Medicines are taken, ought to be the strongest and most penetrating; but the *Ascarides* ought not to be attempted that way, but by sharp *Clysters* and *Suppositories* apply'd to the Part, as *Clysters* of Cedar, Juice of *Nep* or *Catmint*, or a Decoction of *Wormwood* or other *Bitters*, adding Honey; or else *Suppositories* in Form of an Acron, made of *Soap*, *Ox Gall*, *Aloes*, *Coloquintida*, *Sal Gem*, &c. Salted Flesh, and *Old Lard*. Therefore the Cure of the *Ascarides* differs in that from the Cure of the *Teretes*, because they are fed by *Clysters* and other Things thrown into the *Anus*; but these are disturbed by Medicines chiefly taken at the Mouth, because they lodge in the upper Guts; yet you must not altogether neglect internal Medicines, where you aim at the Expulsion of the *Ascarides*; but these are best joyn'd with external Remedies, lest the little *Worms* ascend

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scending upon the *Anus* avoid the Force of *To-picks*. The *Helminthagogicks* therefore mentioned, excell all Things taken inwardly; here also they may agree, and especially the *Aloeticks*; because *Aloes* hath that Faculty, that being swallowed it doth afterwards affect the lower Parts, which those know who are afflicted with the *Piles*; and if *Aloes* scarcely injure the *Teretes*, as hath been observed, it thence follows, the little *Ascarides* cannot be much hurt thereby.

Galen observes, that in expelling *Flat-worms* stronger Medicines ought to be appointed; because as *Mercurialis* thought, the largest Beast must be overcome with the largest Arms; but those Monsters, to wit, our *Tania* of the first Kind, are sometimes kill'd, not with such Force, altho' in very deed they will not otherwise yield but to the most powerful Remedies, as we shall see: But if we treat of the other Kind of *Tania*, or the *Gourd-worms* join'd together, as it were by Links or Chains, these by themselves are very small, neither are they ever reckon'd in the number of Animals of the greater or lesser Size, altho' so united, they measure into one long Animal. But as they are single they are small, yet they require strong Medicines; but whether by reason of the great Number, all of them can scarcely be touch'd by the Medicine, or whether by reason of their Minuteness, they can easily abscond, or from what other Cause soever it is, Authors seem to agree that both these Kinds of *Flat-worms* ought to be master'd almost the same way.

BUT among the most efficacious Medicines, which may serve without Distinction to drive away *Flat-worms*, *Vitriol*, exhibited with *Honey* to the weight of a *Dram*, tho' creating Vomiting, and killing the *Flat-worms* of the *Belly*, is proposed by *Dioscorides*. And a certain Apothecary, *Schenckius* men-

tions in his Observations, giving a *Dram* of *Vitriol* to a certain Man, he voided a *Flat-worm* of an immense Length; but with the most grievous Symptoms and Gripes, so that being almost reduced to Death, he told *Schenckius* of it, who blamed the *Apothecary* for his Rashness. Yet *Vitriol*, at least the *White*, being depurated in a Solution of common Water, and cristalliz'd, may be given safely to grown Persons to a *Dram*, especially if diluted with *Broth* or *Water-gruel*. But a strong, nay, the most powerful Medicine against these Worms, is shewn by *Paulus Aegineta*, to wit, *Euphorbium*, to be given to a *Dram* or two; but in this Place we may well suspect the *Dram* has been put instead of the *Obolus*, which is but ten *Grains*, or half a *Scruple*; since the Dose of *Euphorbium*, according to *Oribasius*, *Aetius*, *Actuarius*, is three *Obolus* or half a *Dram*, according to *Mesue* two, that is twenty *Grains*. Yet *Calius Aurelianus*, in evacuating Water from dropfical Persons, prescrib'd of the same *Euphorbium* to the Quantity of two or three *Spoonfuls*, which Quantity equall'd, if it did not exceed the Quantity propos'd by *Paul*. Here also *Calius* speaks of the lesser *Spoonful*, which at that time held two *Drams*. 'This Medicine, which is the most burning and acutest of all yet known to me, saith *Oribasius*, cannot be taken without Fatigue, cold Sweats and Faintness, as *Mesue* witnesses.' I say, the Antients used this Medicine diluted and temper'd with *Water* and *Honey*, and this chiefly in the *Dropfy*: But we at this Day seldom use it, either thro' Prudence or Fear; or if we shou'd administer this, we shou'd never rise to the large Doses of the Antients.

THE Antients also advised Water *Nitrated* for Expulsion of *VVorms*, throwing in a great deal of *Pepper*: Nay, they had much Recourse to Specificks, widely different from those *Acrids*; among these the *Bark* of the *Mulberry Root* is much commended, which,

which, *Dioscorides* says, boil'd in Water, loosens the Belly, and cuts the *Flat-worms* to pieces. The Taste of that Bark seems at first *sweet*, then a little rough or sharp; but whether the Stools are procured from thence, and the *Flat-worms* expell'd, as is observed by *Dioscorides*, I confess I never try'd. Whatever it was, other antient Physicians did not give Credit to this Bark only, but join'd Medicines to it, which answer all Effects. ' It ought to have ' been, saith *Celsus*, a Water in which Lupines or ' the Bark of the Mulberry had been boiled, or ' to which some of the Powder had been added, or ' *Hyssop*, or *Pepper*, or a little *Scammony*. The Antients also commended the Bark of the Peach-tree-Root, Fern-root, the Root of the white *Chamaleon*; as also to drink a *Decoction* of *Origanum* and *Castor*; the Juice of *Mousse-ear*, Walnuts, the Seed of *Nigella Romana*, the Leaves and Seeds of the greater *Heliotrope*, with *Hyssop*, *Nitre*, and *Nasturtium*; the Juices of *Enula Campana*, and *Southernwood*, particularly commended by *Ælianus*. See Chap. 5, &c.

BUT that the ancient *Rationale* of Cure may be more evident, at least, that I may give a *Specimen* thereof; I shall transfer hither some *Forms* of Medicines describ'd by them. ' The Cure of the *Flat-* ' *worms*, says *Paulus Ægineta*, is agreeable to that ' of the *Teretes*. For they agreed in Drinks from the ' *Acrids* of *Garlick*, and a *Decoction* of *Fern* and ' *Centaury*, and by Clyster an Infusion, as also a ' *Decoction* of *Calamint*, *Dictamny*, or *Penny-royal*. They ' used to drink likewise by way of Precaution, e- ' specially if they had no *Fever*, red *Nitre*, *Pepper*, ' *Cardamoms*, of each equal parts; three Scruples ' of this given in Wine and hot Water: So a *Linc-* ' *tus* of *Pepper*, *Bay-berries*, *Æthiopian Cummin*, *Mas-* ' *tick*, equal parts of each, made up with a due ' Quantity of Honey; this is to be taken the Quan-

' tity of a Spoonful Morning and Night. But if you
 ' wou'd make it more effectual, add more Nitre.
 ' Another Form of Prescription of *Enula Campana*,
 ' *Ammoniacum*, *Pepper*, of each five Drams, with
 ' Vinegar of *Honey* hot, to which add a Dram or
 ' two of *Euphorbium*; this is to be given only to
 ' full grown Persons. Another, the Stem of the
 ' *Fern*, *Nitre*, two Drams, give it in half a Pint of
 ' Water first purging; but it will have a better Ef-
 ' fect if a little *Scammony* be added. Another of
 ' the *Bark* of the *Peach-tree-root*, four Drams, *Pep-*
 ' *per*, four Drams, *Cardamoms*, six Drams, *Hore-*
 ' *hound* two Drams; but to an effectual Cure ex-
 ' hibit *Treacle*, if a violent *Fever* do not prevent
 ' you.' So far *Paulus*. Other *Forms* taken from *Ni-*
 ' *colaus Myrepsius*. ' Take of *Pepper* two Drams, dry'd
 ' *Hyssop* half a Dram, *Cardamoms*, *Nitre*, of each
 ' half a Dram seven Grains, *Diagridium* half a Dram,
 ' given in *Hydromel*. Thus far *Nicolaus*. But it is
 no Wonder that *Diagridium* was prescrib'd by
 him to half a Dram, since the Antients gave it
 to two Scruples. ' The Root of the *Male Fern*,
 ' says *Dioscorides*, destroys *Flat-Worms*, taking four
 ' Drams of it in *Honey Water*; but 'tis better if
 ' given with two Scruples of *Scammony* or black
 ' *Hellebore*; but those who take this ought to eat
 ' *Garlick* before. Nor is there less Strength in the
 ' *Spurge*, and *Squills*, which, tho' very violent, are
 ' very useful against these Worms, and are advis'd
 ' by *Celius Aurelianus*. *Squills*, says he, being ta-
 ' ken and boiled in the sharpest Vinegar, will be-
 ' come fluid, then shake 'em well together, and
 ' *Chamaelea*, *Alkanet*, and *Chalk*, as much as it will
 ' bear, 'till the Mixture come to the Consistence of
 ' a Plaister; then make Pills of the Size of a Bean,
 ' and give according to the Strength of the Pa-
 ' tient; as, to the strong eight or nine, the weaker

' six

‘ six or seven, and to Children three or four Grains.’ *Calius* speaks of other gentler Medicines against flat-Worms, as *Liquorice* and *Polypody*.

The Ancients often used the strongest *Purgatives*, and their Doses or Quantity appear at this day to be very large. Pills prescrib’d by *Trallianus*, of which this is the Composition. ‘ *Aloes* six Ounces, ‘ *Euphorbium* six Ounces; Pulp of *Coloquintida*, *Scammony*, the Gums, of each an Ounce; *Bdellium* an Ounce; *Alexandrian Nitre* six Ounces; Black *Hellebore* an Ounce, taken in Juice of *Colewort*, ‘ *Oranges*, or *Rhodomet*, viz. *Honey of Roses*, six Scruples for the Dose; but not to give so much at first, but by degrees, ’till you come to the entire ‘ perfect Dose.’ Thus *Trallianus* advises, as appears from his last Words. These Pills are commended by the Author for the *Hemicrania*, Disorders of the *Stomach*, *Epilepsy*, and Pains of the *Joints* and *Sciatica*. *Tulpius* thinks them proper for expelling the flat Worm, and undoubtedly they are likely enough to kill Worms of that Kind; but I would not have any one exceed one Scruple for the first time, even in the strongest Constitutions.

But while we are mentioning *Purgatives*, first of all it is observable, that the flat Worms are more easily disturb’d by that Method than any other sort of Physick, which is just the Reverse in the *Teretes*, which do not so readily yield to *Purgatives* of any Kind, especially the milder sort: There is no Dispute of this Matter by any, who will consult the Histories already mentioned of those who have been afflicted with flat Worms; for most of these have found *Worms* of this Kind discharg’d, by taking purging Medicines. That Woman which *Trallianus* takes notice of, ‘ took a purging Powder, which ‘ was *Hiera*, by which means she voided a *Worm* ‘ of twelve Cubits long and more.’ From a Po-

tion of *Hedge-Hyssop* *Heurnius* attests a flat *Worm* was discharg'd from a certain Man: In like manner the Root of *Spurge*, if mix'd with other *Purgatives*, *Jacobus Oethaus* affirms to be effectual for expelling this Kind of *Worms*, and continues to say, that by *purgative Medicines* he brought away the *Tania* from the *Intestines* of certain Women, which happen'd to him three times. *Weckerus* likewise asserts, that from the taking of *Antimony*, a *Worm* was voided of eighteen Feet long. 'A certain strong Man and very voracious, 'as *Schenkius* says, by the Use of *Turbith* with ' *Rhubarb*, and Pills prescrib'd by me for that Purpose, continuing the Use of all these Things, at ' last grew well from a *Flat-worm* that had troubled ' him.' *Clusius* observes the same Thing happen from the Use of the *Aggregative Pills*. So *Caspar Wolphius* gave to a sucking Child the Leaves of *Senna* macerated in *Vinegar* and powder'd, by the taking of which she voided a *Worm* three Ells long. So *Quentzius* affirms, that from a Man subject to the *Gout*, to whom for Precaution sake he had prescribed a purging Medicine, there was brought away one of the longest Kind of *Worms*: By drinking the *mineral purging Waters*, many have seen *Worms* of this Kind discharged, among whom *Benivenius* takes Notice of that in the Place already cited. But *Dodonæus* remarks upon the Place, that a certain Man, from taking a *purging Potion*, had two or three Ells of the *Flat-worm* drawn from his *Anus*. A Country Wench, 'as *Horstius* relates, when she had taken a *Powder* made up of *Species Diaturbith*, with *Cream* of *Tartar*, voided a very long Piece of a *Worm*. Another Girl, from taking six Drams of the *Electuary Diaphanicon*, of the *Facula* of *Briony*, and *Cream* of *Tartar*, of each half a Scruple, was delivered of a *Worm* of the like Kind. A Boy six Years old, from Lozenges of *Turbith*, with

Rhubarb,

Rhubarb, and a Decoction of *Sebestens*, excreted a long *Worm* of fifteen Ells. Some Pills had the same Effect on a Woman, which were composed of six Grains of *Scammony*, *Troches Albandal* five Grains, *Aloes Succotrine* a Scruple, with the Juice of *Worm-wood*.

THAT *Worms* may be discharg'd by *simple Catharticks*, and mild or gentle Purges, without the Intervention of *Specificks*, may be shewn by many Examples taken from the Writings of Physicians. So *William Fabricius*: A certain Woman from taking Powder of *Rhubarb*, *Turbith*, and *Sena*, with a little Syrup of *Roses*, voided a very long *Worm*. Also a young Girl of nine is said by the same Author to have discharg'd a Worm of the same Nature, after drinking a small *Potion* of Syrup of *Roses solutive*, compounded with *Rhubarb*, *Agarick*, and *Sena*, and a little *laxative Powder* of *Sena*. The same Person observes, that a Matron also voided such a *Worm*, by the Use of some *capital Pills*. How great the Power of *Catharticks* is in this Case, we may learn from the Observation of *Olaius Borrichius* already transcribed Chap. the 7th. likewise *John Michael Febr* is Witness of a *Tania* being forced out by a *Cholagogick Powder* with *Jalap*, as that *Worm* which was expell'd by *Tartar emetick*, mentioned by *Daniel Ludovicus*, Chap. 13th. *Tozzi* discharged a *Flat-worm* with Pills of *Aloes*, to which was added the Powder of the *After-birth* of a Woman of her first Child: But whether this Powder was of that great Virtue, or uselessly added, let the Reader consider. I have often seen many Pieces of *Flat-worms*, that have been cast out by that old Man, and at last one with a Tail, which I have instanced in already, by taking of *light Purges*, without being mixed with any *Anthelminthick Specificks*. *Purgatives* as they are necessary, so the Ancients long since shew'd them so
to

to be, as if they were diffident of *Specificks*, by adding *Scammony* so frequently, as appears from *Celsus*, *Dioscorides*, *Paulus*, *Nicolaus*, quoted before. *Fern Root*, says *Dioscorides*, drives away the *Tania* or *Flat-worms*; but much better if given with *Scammony*. The same Words are to be met with in *Paulus* upon *Pliny*, where he mentions the *Fern*.

BUT we can easily understand how the Force and Virtue of *Scammony* and other *Purgatives*, especially of the stronger Kind, expell the *Tania*, if we consider but their *Brittleness*, *Softness*, *Tenderness*, and *Length* together. It is very probable that these *Worms* equally with the *Guts* are stimulated and put in Motion by the pricking Points of the *Purgatives*, as hath been observed, so that the longest *Insects*, where they cannot remain with Conveniency, or are disturb'd from their State of *Indolency*, and not being able to bear the Impression of those poisonous Juices which surround them on all Sides, either perish there, or are forced to quit their Station and creep out of their Beds. But if it happens that they do not presently die with the Contact of those Juices, but are grievously hurt or wounded, then the Bodies of 'em as they loosen'd are seen to hang down at the *Fundament*, where they are struggling to get out, so that the Patient himself, or some other for him, is sometimes obliged to assist at the Birth of the Worm. But sometimes it happens these *Worms* are so tender and brittle while they are drawing them out, that they will often break in pieces before they are wholly extracted. But this ought to be attributed to the contrary working of that *Insect*, where it discovers it self in the Hand of the *Drawer*, and according to the remaining Strength of it resisting; besides that its Body consisting of little Scales, the lowermost of which go under the uppermost, so well dispos'd, that if it is drawn from

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from a lower Part, it will easier slide up, than it can be got forwards, or drawn out; as it happens in *Eels*, when catch'd by the Tail you endeavour to draw them out of a narrow Place. Hence it comes to pass, that a whole *Tania* is scarcely ever seen, as hath been remark'd. Therefore the Patient, after taking of Medicines against this *Worm*, shou'd observe *Celsus's* Direction, to hang a Bag of hot Water at his Anus, that the *Worm*, being invited by the warm Steam of the Water, may come out of its own accord. But if we will have this moved out whole, perhaps Instruments may be invented like those with which the *Africans* draw out their *Vena Medinensis*, which is so long and brittle, with all that Pains and Industry, as we have seen; but I know not how or whether that *Flat-worm* can ever be drawn out whole.

WHATEVER Action there is of *Purgatives* upon these Kind of *Worms*; and altho' by the Help of those Medicines they can be more certainly expell'd than any other way, it does not thence necessarily follow, that all Patients afflicted with *Worms*, by taking a purging Medicine, tho' it be a strong one, shall always or at all times be freed from them, which is worthy Observation. ' Some Years ago, says *William Fabricius*, about Midsummer-time, a certain ' Maid used to void long Pieces of the flat *Worms*, ' &c. being sometimes purged by my Direction with ' Pills of *Aloes*, *Rhubarb*, *Agarick*, and Extract of *Coloquintida*; I also gave her a Powder to kill the ' *Worms*. But what was more, she had a Decoction ' of *Coloquintida* alone given her by an *Empiric*, from ' which being violently purg'd, she voided no *Worms*; ' but the Time prescrib'd coming on, they discharg'd ' themselves. But how this *Worm* should escape being expell'd by such strong Medicines as *Coloquintida*, I do not yet conceive; yet since it crept out ' of

‘ of its own Inclination about the prescrib’d Time, it
 ‘ must be done from a certain critical Motion of Na-
 ‘ ture.’ I have often observ’d the same thing, e-
 specially in the old Man mention’d; for here in
 a stated Course of Time, he readily discharged
 Pieces of the *Tania*, by taking of a gentle purging
 Medicine; but the same Medicine repeated, or an-
 other stronger being given, would not any ways dis-
 turb them, nor would the *Tania* give way to it,
 except once or twice in a Year, but would come
 forth of it self, or at least some part of it. I have
 seen a *Worm* of this Kind in the Fundament of o-
 ther Patients, making its way out, altho’ they had
 taken no Purge before, or any other Medicine.

So we frequently see the *Teretes* or round *Worms*
 spontaneously issuing out of the Bodies of Children,
 tho’ otherwise provok’d by all Sorts of Medicines,
 they could not be driven out. ‘ In *Worms*, saith
 ‘ *Pechlinus*, Fortune is various, as well to *Symp-*
 ‘ *toms*, as to *Cure*; nor are they always destroy’d or
 ‘ driven away with one and the same Medicine, or
 ‘ all, or any how exquisite soever; for they are
 ‘ equally like the Observers of the *Phasis* of the *Moon*
 ‘ or *Sun*, or other *Planets*.’ We shall not waste
 Time to make any Remarks here; but proceed to
 extricate our selves out of the Difficulty here met
 with, of the Expulsion of those *Worms*; and it is e-
 nough to observe, in the first place, since the Signs
 indicating or declaring *Worms* to be there, are al-
 most equivocal, the Remedies sometimes admini-
 ster’d by the Physicians to their Patients are falsly
 apply’d to these *Insects*; in that Case, it ought not
 to seem strange, that the Medicines at that Time
 did not affect the *Worms*. But Women plead, that
Worms are the Cause of all Distempers; and tho’
 by giving a Medicine, the Excrements of the Sick
 are nicely examin’d, and no *Worm* found in them,
 yet

yet they doubt not but the tougher Slime and *Mucus* of the Guts are full of them. Nor are there wanting Physicians to support this old Woman's Opinion. Is it probable, that *Worms*, being kill'd by the Strength of Physick, shou'd lose their Size, and yet not be altogether dissolv'd and reduc'd into a pituitous *Pulp*, except they were very small indeed? But as they vulgarly believe *Worms* are bred from a *Sanies* or Corruption; so they may be as easily resolv'd into the same, one would think, with equal Justice: Indeed, if these *Worms* remain'd in the *Viscera* a longer Time after Death, by so long a Stay they might at length putrify and waste; but this rarely happens.

Nor only Women, but some Physicians, seem to be led into an Errour as considerable, who, that they may expel Worms the more easily, observe the *Phases* or Changes of the *Moon*, nor think they shall be successful if they give *Physick* any other time than in the Wane of the *Moon*. But the Reason why *Worms* sometimes so long and so tenaciously resist those Medicines, nor can they be hurt, kill'd, or driven away by them, tho' of the best Kind, is drawn from hence; first, because these *Insects* baffle the Force and Strength of the *Antidotes*, by fixing their Mouths into the viscous Slime of the Gut; nay, they stick so close to this *Mucus*, that they are scarcely to be separated; secondly, from the various Windings of the Intestines, wherein the same *Insects* can easily lurk or hide themselves. *Leuwenhoeck* is of the same Opinion, thinking that Medicines given against *Worms* do little good; because they have their Heads strictly fix'd into the *Tunics* of the Guts. *Bagliwi* also mentions these Burrows for *Worms*, saying, *Worms* hide themselves in the Cavities of the Gut Colon, to which, since Medicines sometimes are difficultly brought, 'tis no wonder

wonder that we so seldom have Success from the best Remedies in curing the Body of *Worms*.

BUT I cannot see why the Medicines should not reach to those Cavities of the Colon, and other Dens in the *Intestines*, from their *Peristaltic Motion*, the making of the *Chyle*, and separating the *Excrements*: Therefore they are not safe there, and these hiding Places seem too frequent: Nor do the *Worms* immerse their Mouths into the *Mucus*, or the very *Membranes* of the *Guts* so profitably, if those Medicines either by Contact, or otherwise, are so deadly, as indeed they are, as appears from plain Experiments: And it wou'd be in vain for these *Insects* to consult how they should support themselves under Want, and bear a Famine for so long a time, unless they cou'd take care also and provide against the Impression of Medicines upon their Backs, either by strictly contracting the Pores of the Body, or by shaking off those adverse Juices, by continu'd Motions and Vibrations, and in some measure by absterging, or cleansing themselves, which seems very difficult.

BUT allowing the *Worms* to hide themselves, or that they can some other way avoid the Poison for a Time, it is my Opinion, these are the Reasons why *Worms* sometimes so long resist or oppose the Force of Medicines. First, we often err in the Choice of those Medicines; in the next place, in their Doses. And indeed, if we consider the Doses prescrib'd by the Ancients, of which we have laid down some Examples, how much ours are at this Day inferiour to theirs, is easily seen. There may be Danger in too large Quantities; but if, thro' the Tendernefs of the Sick, or some other Cause, we abate too much of an exact or just Dose, we labour in vain. We daily take a small Quantity of *Salt* and *Pepper* in our Viſuals, which taken in
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larger Proportions, would certainly destroy the *Worms*. We may make the same Judgment of other Medicines. Let us here go the middle Way, which is the safest Way, that while we are aiming at the driving away of Worms, we may not otherways injure the Patient, nor by treating them too gently, suffer the Worms to remain unhurt. There is a third Error, that is not of less Concern, whereby we relinquish or quit the Use of Medicines sooner than is proper, only using them once, or perhaps twice, to no purpose, which, if taken often, or continu'd for a Time, wou'd certainly destroy the Worms at last. Among the Causes which no less hinder the Effect of Medicines, we have so long insisted on, one Particular is that of the Stubbornness of Children, who are hardly persuaded or wrought upon to take Physick, to overcome which, the Ancients thought of a certain Instrument, whereby Children were forc'd to swallow whatever they gave them, and this you have describ'd by *Paulus Aegineta*, Book 4. Chap. 57.

AGAIN, how necessary it is to repeat the Use of Medicines often, if we wou'd expel Worms with Certainty; or it follows from thence, that as hath been observ'd, that the infected Liquors taken at the Mouth, pure or unmix'd, do not reach 'em, but being alter'd as well by the Ferments of the *Viscera*, as particularly by the different milder Juices in the Stomach, and from thence receiv'd into the *Guts*. And hence it comes that the Medicine taken, only slightly affects the Worms the first time, besides that in a few Hours time it is discharg'd from the Body with the Excrements, and succeeded by fresh softer Juices, by the coming in of which the injur'd Insects are speedily recover'd from the Damage they had sustain'd: But if that offensive Medicine be frequently and daily repeated, then the

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whole *Duct* or *Cavity* of the *Guts* is never empty of these malignant Juices, whether collected together in the space of some Days, or frequently taken at the Mouth, and thence convey'd to the *Intestines*, or afterwards from their *Glands* and *Arteries* to the whole Mass of Blood; so that from every Part being assaulted, and thro' the whole Course of the *Guts* being daily supply'd, these tender *Insects* cannot resist. But if Medicines should be exhibited which kill Worms, but were not *Catharticks*, then the Business is done without the Use of *Purgatives* at all; yet then we ought to be cautious lest the dead *Worms* should stick in the Bowels, be detain'd in the *Faces*, and afterwards corrupt or stink, and so breed malignant Vapours that might ascend to the vital Parts, which hath been the Opinion of some Practitioners.

THE fourth Error lastly, or rather Infatuation hath been that of them, who confiding in one single Medicine, whether simple or compound, will only make use of that, and what cannot be done by that, think can never be perform'd by any other Medicine. But these Kinds of *Insects* are not to be given up to any one sort of Medicines, tho' of the best; for we are taught from Experience, not only to repeat, but vary those Medicines which we find hurtful or destructive to Worms, and lay all the Snares we can to extirpate them. We have an eminent Example of a Method of Cure of the *Gourd-Worms*, already related from *Horatio Augenio*, in Ch. 9. Therefore we ought to imitate this Author, by diversifying our Medicines, in order to arrive at the same equally good Success; or if these rebellious *Vermin* will not submit, we must at last make use of the strongest Remedies, as hath been observ'd and directed. But first we ought to be sure, from the proper *Symptoms*, that there are Worms, before we disturb

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sturb the Patient to no purpose. And here is occasion for Prudence ; because most of the *Signs* or *Symptoms* of *Worms* are equivocal, and there is scarcely any to be depended on , whether there be one , or two, or more, or whether particularly the Patient labours under the Oppression of the *Teretes*, or the *Tenia*, a *round Worm*, or the *flat one*. This will furnish us with Caution how we exhibit too strong Medicines at the first ; for where we only design to make use of the common gentle Kind, these we administer unsuccessfully sometimes , we at least do no harm ; and particularly if we aim at the Expulsion of the *round Worms*, our Designs are answer'd.

NEVERTHELESS, if as from the Examples laid down it follows, that Medicines are sometimes necessarily to be varied, hence perhaps we deduce the Cause, why the flat Worms were driven out in some of the aforementioned Cases by *Purgatives* that were not of the strongest Kind ; this might happen so, tho' but one Kind of Medicines were made use of. But now, why some Worms are not provok'd or moved sometimes with any Kind of *Physick*, so as to quit the Body ; if it be ask'd, it will be answer'd from the *Teretes* or *round Worms*, which from their Size, and sometimes Number, fill up the whole Tract of the *Guts*, as also from the *Ascarides* and *Gourd-Worms*, one or other, or more of them being chased or driven forward, may fall out of the *Fundament* with the *Excrement*. The *Teretes* likewise in continu'd Fevers not being able to bear the Acrimony of the Humours, fly the same way, and may be easily thrown out, either in *Flux*, or the solider *Mass* of the *Feces*. The antient Physicians affirm'd they were thrust out by a *critical Motion* of Nature in *acute Diseases*, and disputed much among themselves, whether it was better to eject them *alive* or *dead* ; but this Enquiry seems to be of small Moment, as to the

Practice of Physick. The flat *Worms* are disturb'd from a different Motion, which *Fabricius* suspects to be done without a *Fever*, and says, that Worms of this Kind sometimes resist the strongest Medicines, and are affected at certain Periods of Time with gentle ones; from whence he concludes that they are often expell'd, as it were by a certain critical Motion of Nature. But I own no such *Crisis* here; but if there be any room for Conjecture, I believe that the flat Worms, especially the *Tenia* of the first Kind, may be easily expell'd, or, as it were, drawn out spontaneously, when the Body thereof is grown to such a Length, that sometimes it fills the whole Guts from the top to the bottom: This being granted, the Worms, whensoever they would move or contract themselves with Agility, as usual, cannot, by reason of the Juices crowding them on all sides of the Guts, or from the extraordinary Motion thereof; whence it comes, they cannot stick there so close as usual, but are oblig'd to seek for Room, whence they make their way to the strait Gut, and so to the *Anus*, where hanging out, they are extracted by the Hands. So the *Maid*, of which *Fabricius* speaks, voided a long Piece of the *Tenia* once every Year, which was discharg'd either spontaneously, or by taking a gentle Medicine, because there were little Rings, which were those Worms, which increased in the Compass of every Year, tho' at another Time they wou'd not give way to *Coloquintida*, because then they were shorter, and cou'd easily contract themselves so as to adhere or stick fast to the Coats of the Guts.

A German Woman, of whom *Spigelius* treats, as we have mentioned, after Supper, wherein she had eaten Lettice, with Oil and Vinegar, discharg'd a long piece of the *Tenia*, like that of the former Case; because that *Tenia* not yeilding otherwise to so gentle

tle a Treatment; had by Course of time increased and grown to a vast Length. That *Tania* therefore perhaps appear'd more lively, because it rather fled from this *Sallet*, than was so heavily affected by it, as to be driven out; for it is probable that some of the Sinews of this excreted *Insect* are more agile, some more sluggish, and seem to be actuated with Life and Motion more or less, according to the Strength or Weakness of the Impression taken from the Medicines given, as I have before observ'd, in handling the Question, whether the *Tania* be an *Animal*? But the same *Insect* cannot always be expell'd by *Sallets*, as I have given you an Example in the old Man, who always eat *Sallets*, but did not therefore daily void Pieces of the *Tania*. And perhaps *Spigelius's* Woman was not so accustomed to this Kind of Diet; whence it might happen, that the *Tania* was the more easily hurt thereby. As to the rest, it is no Wonder why *Worms* are offended at *Sallets*, wherewith *Vinegar* and *Oil* is eaten, since *Salt*, which is so great an Enemy to the *Tania*, is so plentifully used therein.

THUS far of the Remedies for all Kinds of *Worms* inhabiting the Guts, especially the *Teretes*, *Ascarides*, and *Lati*; but of Medicines against other *Worms* infesting the Parts of human Bodies, we have in some Measure taken Notice of them, while we were describing the various Kinds of *Worms* in their proper Places. There only wants a Word to be added of the Reason of cleansing and curing of *Ulcers* and *Vermineous Wounds*: The Part affected then ought to be washed with the *Decoctions* of *Plants*, and other *Simples* mentioned against *Worms* in the general proposed Catalogue, as for Example, in a *Decoction* of *Leaves* of *Wormwood*, *Calamint*, *Horehound*, *Peach-tree-leaves*, &c. likewise the Juices of *Celandine*, *Beet*, and *Leeks*, and so with *Sea-water*, or

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that made with *Salt-petre*, *Pepper*, *Alum*, *Vitriol*, *Brythwort*, and *black Hellebore* powder'd, &c. Against *Worms* of the *Ears* the *Ancients* prescrib'd: Take of the *Juices* of *wild Cucumber* and *Sage*, of each equal Parts, mix and pour into the *Ear*, *Galen*, Book 3. of the *Composition of Medicines*. And in another Place thus: Take of *Opium* one *Scruple*, *Myrrh*, *Nard*, and *Saffron*, of each half a *Dram*, burnt *Brass*, two *Scruples* and a half, *Alum* one *Dram*, *black Hellebore* three *Drams*, mix, and apply this to the *Ears*. *Pliny* commends the *Root* of *Galingal* boil'd in *Water*, and the *Urine* of a young *Boy*, the *Juice* of *Hemp*, *Rue*, *Black-berry*, and *Fruit* of *Capers*. There are many other *Medicines*, especially those delivered by the *Ancients*, which I shall pass by, having already exceeded the *Length* I first propos'd in writing this *Treatise*.

F I N I S



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